The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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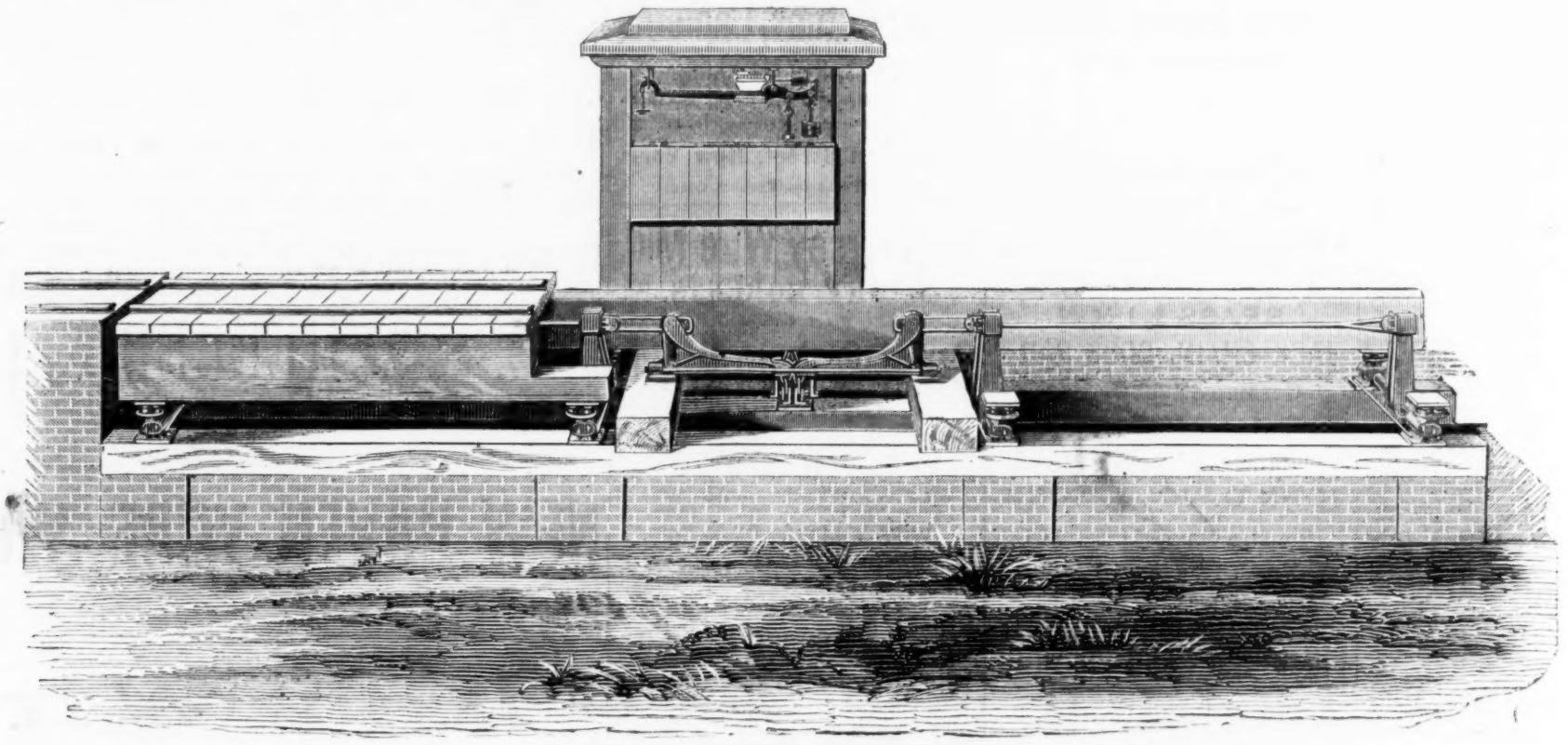
Howe Railroad Track Scale.

We illustrate upon this page a Howe railroad track scale, by Messrs. Page & Co., 3 Park place, New York city. The scale is 32 feet long, and capable of weighing 30 tons. The depth of the pit, from the top of the platform to the top of the brick-work, on which the foundation stringers rest, is but 37 inches. The platform of the scale itself is 6 feet 8 inches wide. A scale of this size is large enough to weigh freight cars of all kinds. The construction of a large scale, for such purposes as this, is one of the really difficult mechanical problems, but one which has been so perfectly solved as to leave but scant room for improvement in the matter of accuracy.

In no direction have measurements of precision been carried to such perfection as in weighing. Balances for the use of the laboratory are made which weigh with almost miraculous accuracy, but they have to deal chiefly with quantities which seem infinitely small compared with those of commerce. The accuracy of such scales as those we are illustrating are, however, almost equally astounding. A 20-ton scale of this pattern, when loaded, has been made to turn with the weight of a quarter of a dollar laid upon the platform; and, when the more complex character of the machinery is taken into account, this seems fully as difficult a feat to accomplish as the making of assay balances that turn with 1,000,000 part of a 10-pound load in the pan. Several years since an amusing case of the incredulity of people generally in regard to the accuracy of scales came under our notice. The Brandon Manufacturing Company were putting in a 300-ton Howe canal scale for a canal company in the middle States, we believe, which, according to contract, was to turn with four ounces when loaded to its full capacity. The scale was set, and when the first test load was put on, but before the adjustments had been made, the scale turned the beam with a 4-pound weight; the company, more than satisfied, accepted the scale at once and refused to allow the men to touch it for any further adjustment, deeming that such accuracy could only be accidental, yet really there was no difficulty in making the scale come up to the contract accuracy. The means by which such remarkable results have been obtained are found in design and workmanship.

First, the bearings are protected from wear, and consequently the adjustment can be carried to the highest point of perfection without being afterward damaged by the service to which they are subjected. The protection is effected in a very neat and perfect manner. Instead of allowing the platform to rest directly and rigidly upon the knife edges, each knife edge carries a plate or socket in which are two chilled iron balls; it is upon these balls that the platform rests, consequently it is free to move without disturbing the knife edges.

Incidentally this adoption of the chilled iron balls to reduce the friction tended to improve a second important feature of the scale, namely, the design. In a scale, of the style shown in the cut, with a 32-foot platform, there are but thirty-nine knife edges all told. The system of levers and rods by which the small weight upon the beam balances the load upon the platform is peculiarly neat. If we may be allowed the use of the term, a series of rock shafts, resting on two knife edges each, and provided with vertical arms, are placed crosswise beneath the platform. Two of these are shown on the right of the engraving. The platform rests upon these rock shafts, or levers, in such a way as to cause an outward pull upon the rods by which the vertical arms are coupled; this is transmitted to the longitudinal levers in the center, which, through a cross beam, called the extension lever, beneath them, transfer it to the beam through the beam rod. This design is not only very simple and accurate but very durable. Two fifty-ton scales of this sort put up some years since in the coal regions, where they were in constant use, have cost almost nothing for repairs and are still in working order. These scales have weighed many million tons of coal, and there seems to be no reason why they should not weigh many more and still retain their accuracy. This design has one peculiar if not unique feature—the platform can at any time be lengthened indefinitely and the capacity of the scale increased in proportion without the necessity of rebuilding it. All that is necessary is to increase the length of the pit and other cross levers or rock shafts and couple them together like those on the right of the cut. In the beam there is no change further than to add the necessary weights.



HOWE RAILROAD TRACK SCALE, BY MESSRS. PAGE & CO.

The Washington *Star* says: The United States consul at Antwerp, in noting the absence of American manufactures at the agricultural fair recently held in that city, informs the Department of State that there can be no doubt about the superiority of our agricultural machines and implements over those on exhibition there, and that our manufacturers, by patience and perseverance in their introduction, could overcome the conservatism and prejudice of the Flemish peasants and farmers and build up an extensive trade in Belgium, and that what holds good in Belgium is equally applicable to every other country in Europe.

The Telephone in England.

At the last meeting of the British Association, Mr. Graham Bell was present, and gave an exhibition of the telephone. Previously a gentleman had given a lecture upon the telephone, and the methods which different experimenters had used to accomplish the feat of transmitting the sound of the human voice. Prof. Bell stated at the outset that after the lecture it would be scarcely necessary for him to put before them a description of the construction and the operation of the telephone in its present form, but he thought it would be interesting if he took up the subject in another light, and showed them the evolution of the telephone, and describe to them the process by which the instrument had been brought up to its present state. Having alluded to the fact that it was now some years since his attention was first directed to the form of the vibrations of the air during the production of speech, and having pointed out that he was not aware how the idea of using electricity as a means of conveying these vibrations from one place to another suggested itself to him, Mr. Bell gave an interesting account of the time and labor which he, assisted by Dr. Clarence, J. Blake, Prof. Pearce and other friends on the other side of the Atlantic, had devoted in endeavoring to discover some means by which the sound of the human voice could be successfully conveyed to whatever place was desired. He gradually traced the progress of these researches, and enumerated the different forms of instruments which had been invented for the purpose of accomplishing the object desired, several of which instruments he exhibited, at the same time explaining that experiments were still being made in Boston with a view to further improvements in, and in the further development of, the telephone. He confessed that he did not yet know which was the best form of instrument that could be used, reminded his audience that he did not bring the invention before them as a perfected one, that it was still in embryo, but expressed a hope that at the next meeting of the British Association he might have the opportunity of producing before them still more perfect forms of the instrument. Prof. Bell then announced that he had brought with him his telephonic organ, and that he should presently attempt to produce a little "bad" music for the benefit of the Association. This organ, he explained, resembled a harmonium or parlor organ. The reeds were all connected with a battery, and in front of each reed there was a little screw with a platinum point. When the instrument was blown the reeds vibrated against the screws, which were all connected with a telegraph wire, which had been brought into that room, and contact being made, the music was thus conveyed. He also explained that the organ was in the Guildhall, and that telegraphic communication had been made between that building and the post office, and between the latter place and the room in which they were then assembled. Experiments with the instrument were then proceeded with, the telegraph wire being attached by Mr. Preece to a telephone with a powerful battery and with a somewhat capacious "mouth." Harris, Mr. Preece's assistant, who was stationed at the post office, was then communicated with by that gentleman and told to request the organist to "strike up," and almost immediately the audience were astounded by hearing with perfect distinctness the well-known air, "God save the Queen." The organist was then ordered, through Harris, to play "something with chords," and again the sounds of music were clearly heard, although this time the tune could not be recognized. Another instrument without a battery was then connected with the wire, but, as Mr. Bell had prophesied, the sounds of music conveyed to the audience by means of this instrument were very faint, being audible only to those at the top of the room. The first instrument was now again used, Harris being requested by the Professor to sing as loudly as possible. In a second or two the favorite song "Auld Lang Syne" was heard with remarkable clearness, although many of the notes were somewhat "shaky." Harris next read a newspaper paragraph, and although the sound of his voice was distinctly heard no one was able to ascertain the subject of what he was reading. Prof. Bell explained the reason of this, and informed the audience that the louder the voice was at the transmitting end the more indistinctly it was heard at the other end.

We believe it was but a few days after this that the telephone was used for communicating speaking signals from the bottom of the shaft of a deep mine to the surface. This use we think was first suggested by the *Engineering and Mining Journal*. In giving an account of the experiment the Sheffield *Independent* says: Hitherto no speaking signals to the surface have been possible in mines of great depth, and cord signals have been very indefinite. Recently Dr. Foster, government inspector of mines, and his brother, an eminent London electrician, conducted experiments at the Eliza Mine, St. Austell, with the telephone, which had never been tried in a mine. The little instrument, attached to a covered copper wire, was sent down the ventilating shaft, and within a quarter of an hour speaking at the bottom of the mine was distinctly heard: songs were sung and questions asked and answered, demonstrating its thorough adaptability to mines. It was used by miners and others who had never seen the instrument before, and being so simple, efficacious, inexpensive, and quickly fixed, it might be adopted at once in every mine in the country. A alarm calls attention when speaking is desired at either end. The importance of telephones in mining operations can scarcely be overestimated, as the wire and instrument are portable and can be carried to the extreme point of any mine.

New Rail Joint.

The London *Mining Journal* gives the following account of a rail joint recently invented in England. In connection with railways nothing can be of greater importance than the securely fastening of the rails, and as a result of the present system many serious accidents have taken place involving considerable loss of life and heavy pecuniary compensation on the part of railway companies. Very frequently it happens that the bolts give way and the ends of the rails become loose, and the trains go off the lines. The fastening of rails by bolts is the mode adopted by English railway companies, which has been found not only defective but dangerous. On some of the French lines the rail is fixed to the sleeper on the inside by a spike with two claws driven into a hole punched in the flange of the rail, so as to counteract any tendency of the rail to slide in the direction of its length, or to go over on its side. On the outside of the rail the fastening is by means of a dog. A revolution, however, in the mode of fastening rails appears likely to be effected by a system patented by Mr. Acaster, of the Princess Works, Sheffield for the advantage connected with it are apparent. The specification states that the object of the invention is the providing of a strong self-locking and elastic joint that will cause the rail ends to act equally in every way on the approach of an engine or engine and train. The principal of the invention consists in the application, for the purpose of jointing and supporting the ends of the rails, of wedge keys of iron, steel, or other material, and of a peculiar shape. The wedge-shaped keys are longitudinally grooved and ribbed, and are driven into sheathes grooved and ribbed to correspond. The sheathes clasping the rail ends on each side by the force of the wedges driven into them form a self-elastic locking joint, in which there is no wearing and working, and make a continuous rail surface, which is the great object desired by those having in charge the permanent way of our railways. The wedges and sheathes can be equally adapted to rails of different sections, and are capable of being modified by an engineer who may choose to adopt a different style, but who, at the same time, wishes to do away altogether with nuts and bolts. As the invention is about to be tested on the Midland Railway, we shall be able shortly to say more about it, but at the same time, with our present knowledge, there is little doubt but it will be a sure success.

Glass Hardened by Compression.—In the Siemens' glass works, at Dresden, there is now manufactured a product which has the same properties as La Bastie's tempered glass, the strength being communicated by the pressure of metallic rolls. Plates can be made, by this method, of much larger dimensions than by La Bastie's. They have a beautiful look, and can be ornamented with the most complicated designs, at a less cost than ordinary glass. Siemens claims that glass manufactured by his process has a greater strength than tempered glass, in the ratio of 5 to 3. When broken it shows a fibrous structure, while La Bastie's is crystalline. For equal thickness the resistance of a plate of compressed glass is from seven to ten times as great as that of an ordinary plate. In trial experiments performed before the Berln Polytechnic Society, a lead ball weighing 120 grams or about 4 ounces was let fall from different heights upon plates arranged horizontally and supported only at the four corners. While an ordinary plate was hivered by the weight falling from a height of three decimeters, or nearly 12 inches, the plate of compressed glass of like dimensions broke only when the weight was let fall from a height of three metors, or a little less than 10 feet, and even then only under the influence of many successive blows.

Cleopatra's Needle.—Some of the English public have awakened to the fact that the gift of Cleopatra's Needle is likely to be an embarrassing one. The London *Spectator* says: "The Alexandria obelisk is safely packed in its sea-going case, and by this date the strange vessel is probably rigged. In fact, there is every prospect that it will arrive in the Thames long before it is wanted or people know what to do with the embarrassing block. Opinion is pretty unanimous that it will be a monstrosity and a mote in the eyes of people of good taste in the position where the Board of Works has set up the wooden model for criticism. It would be dwarfed there by its vicinity to the Clock Tower and the Abbey, and it would be quite out of keeping with the statues of Lord Derby and Lord Palmerston and Gothic architecture. The Horse Guards will not have it on the parade in St. James' Park, where it would be in the way of the troops; and if it were set up in front of the British Museum, as has been suggested, it would be lost sight of in the closely surrounding buildings. Does not this difficulty show that it is a mistake to treat the gift as a possible civic ornament? Ancient scraps stuck in modern surroundings are—as witness Virginia water—generally poor in effect, and their true home is a museum. As things look at present, London is likely to have two awkward antiques, in the shape of Cleopatra's Needle and Temple Bar, on its hands. Would any of our colonies like to buy them as a souvenir of the old country?" To bring this work of antiquity to England is only a little less than sacrilege. It will only be a few years before its sculptures will be ruined by the atmosphere, and nothing but an excessively ugly stone will remain. The only reasonable thing that can be done with it is to take it back to Egypt and erect it in some suitable locality."

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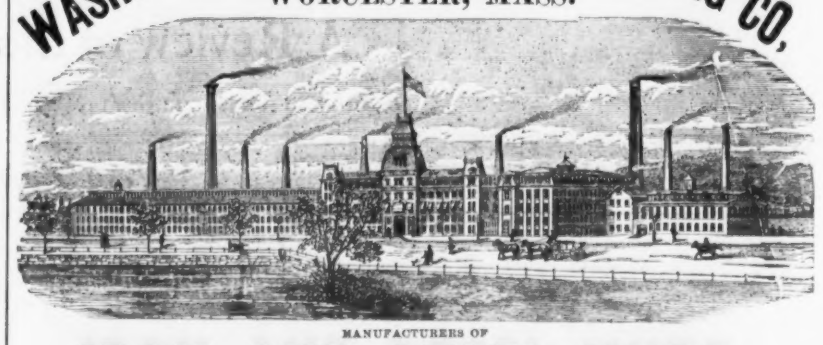

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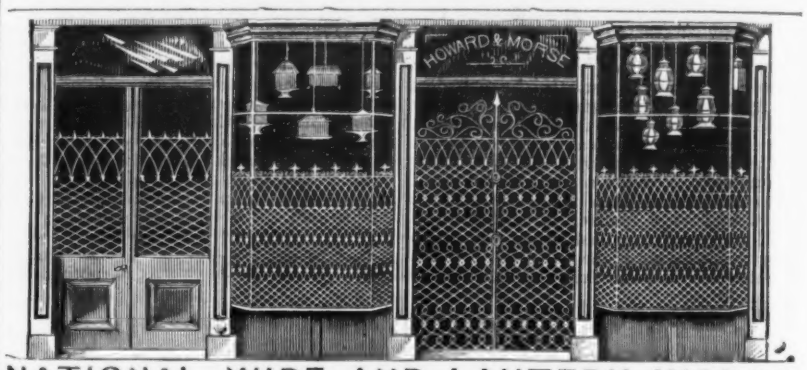

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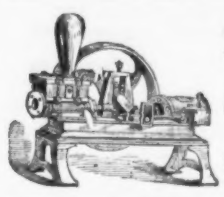

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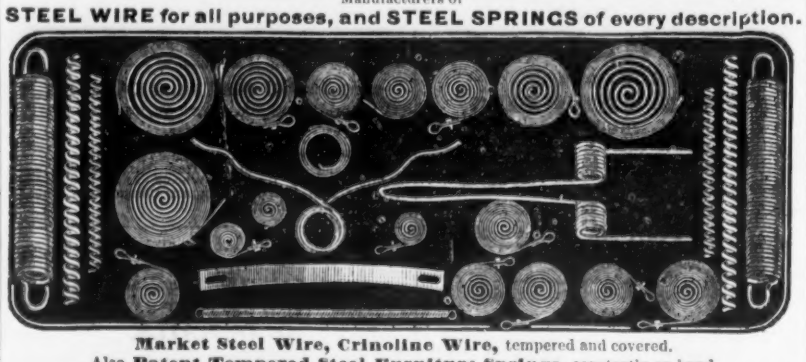

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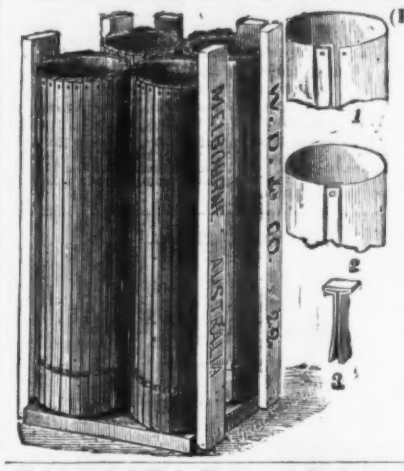

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Submarine Warfare.

However much torpedo warfare—like the use of explosive bullets—may be considered by some as being open to objection, it is quite certain that civilized nations have not as yet manifested any disposition to adjure the use of this formidable submarine weapon in the way that they have agreed to ignore the bullet. On the contrary, every subtle device that science can offer or ingenuity suggest is being pressed into the service in order to render the torpedo as deadly to foes and safe to friends as it possibly can be. On the other side of the question, there are not wanting ingenious suggestions relating to precautionary measures. Schemes are rife for fishing for torpedoes, for protecting vessels from contact with their unseen foes, and for localizing as much as possible the deadly effect of an explosion should the ship be reached.

The London *Times* says: In view of the growing importance of the torpedo question, and of the fact that maritime nations are alike progressing in the special art of torpedo warfare, it behooves us to allow no opportunity to pass which may aid in the development of the system, which, as yet, is but in its infancy. With regard to moving torpedoes, the aim undoubtedly is to be able to deliver and explode these weapons against an enemy's ship without their presence being suspected or the source whence they were sent being visible. In order to effect this, submarine navigation is desirable, and anything bearing on that question, if not visionary, is worthy of attention. It may probably occur to some of our readers that such a submarine vessel as is described by Jules Verne in one of his clever *brochures* would be exactly the thing to have. So such a vessel undoubtedly would be, and this idea has occurred to others who have to a certain extent embodied it in practice. The first embodiment, we believe, occurred during the Confederate War, when one of the earliest torpedo boats succeeded in blowing up the Housatonic; but at the same time she destroyed herself with her daring crew of nine men. She was recovered by divers some three years after the affair, side by side with the hull of her sunken antagonist, and with the remains of the nine men still on board. The little boat was submerged at an angle by admitting water into her bows and driving her downward by means of a screw propeller. The probability is that either the angle or the speed was too great—or even both may have been in excess—and that she drove her nose, ram like, into the muddy bottom, from which she could not withdraw herself.

An invention of a similar character and of American origin, but of far greater pretensions, was some time since brought under the notice of various governments, including our own. This was a submarine boat, resembling a porpoise in shape, and which it was stated could be made large enough to contain 15 men. She was said to be capable of remaining under water for a great number of hours, and from her sides torpedoes could be affixed to the bottoms of vessels long distances out at sea, while numerous other operations could be performed. The boat was also to carry a large gun, which could be loaded under water and fired at the surface. The only practical application of this invention was, according to the patentee, the construction of a boat weighing about eight tons, in which he and others remained under water for four hours under Lake Michigan without any communication with the atmosphere. He is also said to have propelled his boat at the rate of three miles an hour at the bottom of the lake, and to have sawn off timbers 14 inches square. There was no limit, however, to the services of which the craft was said to be theoretically capable; but for all this we are not aware of its practical adoption in any quarter. A third invention of the same class was that of Mr. Villeroi, who, according to American papers, devised a submarine salvage boat, in which he and eight men descended to the bottom of the river at New Castle, Delaware, and there remained nearly five hours without any communication with the external atmosphere. The boat was of iron, 35 feet long, 44 inches diameter, and was propelled by a screw and guided by fins. The supply of air was supposed to have been maintained by chemical agency. It is on record that one Cornelius Dreble constructed a subaqueous vessel for James I., with which he experimented in the Thames. The boat is said to have carried 12 rowers, besides passengers, for whom the purity of the air was maintained by chemical agency. In later times—viz., in 1796—Robert Fulton, who is well known in connection with the early history of steamboats, proposed a submarine vessel, and he obtained assistance from the First Consul in 1801 in carrying out his idea. His vessel was called the Nautilus, and he carried out some experiments with it at Havre. He immersed his ship to a depth of 25 feet, and succeeded in remaining under water for an hour. He afterward improved his arrangements, and is said to have remained submerged for more than four hours with three other persons, highly compressed air being used for respiration. He also succeeded in propelling his boat some distance during submersion, and afterward to a certain extent in demolishing vessels by exploding gunpowder under them. The principle of submerged boats has also received attention at other hands, but on paper only, and, so far as we are aware, the only practical examples extant are those to which we have already alluded. The principle, however, is one which commends itself for the purpose in view, and any reasonable attempt to reduce it to practice is worthy of consideration.

We have been led to the foregoing remarks by having recently investigated an invention having for its main object the fixing and firing of torpedoes under water. This is a submarine vessel which can at pleasure be moved on or under water. It is the invention of Mr. Joseph Jones, a shipbuilder of Liverpool, and a gentleman of experience in naval matters, and who is known for his advanced and practical views upon certain questions connected with naval warfare. Mr. Jones' vessel can be made to descend to any required depth in the water, as we have seen from a working model, to move forward or backward in a straight line at any level, to go deeper or to rise to the surface. By the arrangements proposed she would be as much under control as any steam torpedo launch now in use. Mr. Jones' object is to be able to start out of sight of the enemy, and, moving along under water, to lodge a torpedo under the bottom of an enemy's ship or in his waters. In the model which has been submitted to us by the inventor he certainly makes out his case, but, of course, between a model and a perfected apparatus there is a wide gulf, which in the end may or may not have been successfully bridged. Taking the invention, however, at it stands, and considering the present advanced state of applied science, there is a reasonable prospect of success before the inventor. At the same time it is desirable and necessary that careful experiments should be made before any very sanguine hopes are indulged in. The invention, however, is not without merit, and as we understand the inventor has offered to submit it to the Admiralty, it is to be hoped that the authorities will bestow upon it the attention it deserves. We are not at present at liberty to enter into the details of the invention, although we hope shortly to be able to describe it fully. In the meantime we may observe that it is certainly a step in the right direction, and if successful it will mark a distinct era in the history of submarine warfare.

An Iron Concert Hall.

Ryland's Iron Trade Circular, in a recent number, has a very interesting account of a novel building just erected at Carnarvon, North Wales, which merits attention from its large size and the material of which it is built. It compares favorably with any iron building in Great Britain for strength, beauty, comfort and acoustic properties. It has been erected for "The Carnarvon Pavilion Company (Limited)," a local company formed for the purpose of supplying Carnarvon with a suitable public hall large enough to accommodate at least 6000 persons, and for letting the building on hire for the holding of eisteddvodu, concerts, entertainments, bazaars, lectures and other public meetings. The pavilion is the largest public hall in the principality, being 200 feet long and 100 feet wide. It is built in three spans or bays, 34 feet high to square and 54 feet high to the apex of the ventilator. The main roof is carried by wrought iron principals of elegant design and substantial workmanship, combining lightness with durability. The rafters are of T-iron, and the ties, strut rods and braces are all of round iron. The principals are supported by massive cast iron columns of appropriate design, having octagonal bases and molding, a band running round the shaft and ornamental cap and cantilever brackets springing from the square part of the column. The whole is chastely picked out in various colors. The lean-to roofs are supported by timber rafters, struts and tie-beams resting upon brackets cast on columns to receive the same, and upon the side framing, which is of timber, as in the gable end framing. The roof, sides and ends throughout are boarded, stained and varnished, and on the boarding is laid a layer of non-conducting, inodorous felt, to prevent the possibility of draught and to render the acoustic properties of the building more complete. Galleries extend along almost the whole length of each side, supported by timber beams, bearers and struts, wide pitch-pine staircases leading to and from the galleries to the level of the floor, and the galleries being protected along the front by an elaborate ogee section railing of suitable design in cast iron. The exterior of the pavilion is entirely covered with galvanized corrugated iron. The lighting of the building is admirably arranged by means of segment and other lights at each end of the hall; at the sides by continuous lights along the main and lean-to eaves, and by circular-headed French casements, the latter of which are all made to open for ventilation, and a continuous ventilator also runs along the entire length of the main roof. The pavilion was designed and erected by Messrs. Isaac Dixon & Co., (Limited), contractors, of the Windsor Iron Works, Liverpool. The building is unique in style and character, and specially suited for its purpose at a comparatively trifling cost.

The pavilion has probably been practically tested by the present time, as it was intended to hold last week the "Carnarvon National Eisteddvod, Gorsedd and Musical Festival" in it, under the presidency of the Right Hon. Lord Penrhyn and the patronage of some of the leading squirearchy of North Wales.

Refrigerator Car For Explosives.—Mr. Mowbray, of North Adams, Mass., has just shipped in a refrigerator car ten tons of mica powder to Fort Francis, 200 miles east of Winnipeg, a part to be used on the Francis Canal and a portion on the Northern Pacific Railroad of Canada, at Keewatin. The rock is so hard at both these points as to require an explosive of greater disruptive power than gunpowder, and this mica powder appears to answer the purpose exactly. The car used has been built for this particular purpose, it being necessary to maintain a temperature below 50 or 60 degrees. The thermometer in this car has registered from 39 to 41 degrees on the whole trip. This mica powder consists of tri-nitro glycerine and scales of mica, or Muscovy talc, in nearly equal proportions, and the object of a low temperature is to congeal the tri-nitro glycerine, which in this condition is absolutely non-explosive, and may be transported as safely as a box of soap. Two messengers, necessarily experienced in handling this powder, always accompany the car, in which a comfortable apartment has been provided for them. Their duty is simply to watch the temperature. In case of a smash-up, even, the cellular construction of the car renders explosion impossible, and if thrown on the fire of a locomotive there could be nothing more serious than a rapid burning of the powder. For eight years past this powder has been teamed to distant points, and although accidents have happened to the wagons, absolutely destroying them, neither explosion nor fire has ever resulted. The quantity carried has exceeded 3,000,000 pounds.

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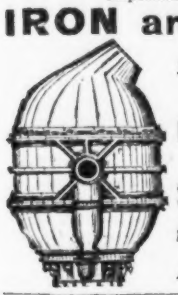
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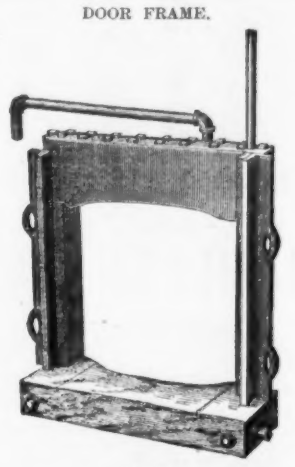
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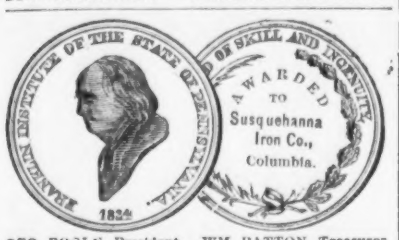

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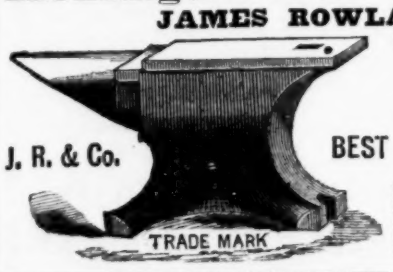

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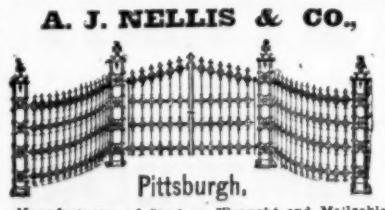

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Boiler Explosions.

Mr. John W. Hill, M. E., contributes the following valuable paper to *Van Nostrand's Magazine:*

The alarming frequency of explosions, especially in the rural districts, demands that the attention of State Legislatures be directed to a speedy solution of the important problem of safety in the use of steam boilers. The interest of the public in a proper system of inspection of steam boilers is rapidly developing, and the necessity of such a surveillance of the manufacture and operation of this eminently useful and dangerous adjunct of civilization, as will reduce explosions to a minimum, is probably felt by all, however remotely interested in steam machinery.

What is required is the appointment of a Board of Inspectors in every State, to investigate and report upon every explosion, as well as to pursue a rigid system of inspection of the construction and use of steam boilers.

While it is not imagined that such a board could enter upon their duties sufficiently charged with information to prevent all explosions in the future, their association with the work from year to year, and by frequent exchange of views with other similar boards, would presently expand and develop their knowledge in a manner not to be attained by other processes.

It appears to the writer that the appointment of an engineer with a selected corps of assistants, to inspect all boilers now in use and recommend legal measures for the prevention of disastrous explosions in the future, would be quite as desirable a "luxury" as the usual geological corps, for while the labors of the latter may improve our knowledge of the physical structure of our respective increments of the sphere, and open up avenues to unexpected wealth, the labors of the former will save priceless lives and property to the extent of millions.

That there are certain political objections to the inauguration of such a system is admitted, but the combined wisdom of our State law makers should be sufficient to meet the "legal" and "moral" impediments to a rigid law regulating the manufacture and use of steam boilers.

However this may be, no one who is a constant reader of the metropolitan daily papers can doubt the necessity of a careful system of inspection of the materials and workmanship employed in the construction of steam boilers, and in the use of the boiler after it is set to work.

The great majority of accidents are not with boilers in the hands of men who, from the force of circumstances, are supposed to have a certain knowledge of the "regimes" to be established in operating a steam boiler, but with the rural steam users whose knowledge is naturally very "limited," and as naturally very "dangerous." Whether the frequency of explosions in the "country" is the immediate result of the lack of appreciation of the dangers surrounding a seething boiler, or to impositions practiced on the unwary by knavish boiler makers in furnishing poor workmanship and defective materials, is a question to be determined. That poor materials and workmanship are often the "prime" cause of disastrous explosions is well known, and however this may be, a system of rigid inspection, by competent officials in every State, would speedily bring the construction and use of steam boilers to the proper level.

The system of inspection should embrace: The form of boiler as affected by the water of the locality in which it is to be used; the variability of load, and the fuel to be burned in the furnace; the dimensions as affected by maximum capacity required; the thickness of plates, class of riveting and caulking, and quality of iron to be used as affected by maximum pressure under which the boiler is to be worked; the test to be applied to the iron used, and the tests to be applied to the finished boilers; the manner of heating and purifying the feed water and its introduction into the boiler; the style of furnace to be used and general arrangement for facility of inspection; the safety appliances, and standard of tests for "steam gauges," "safety valves," low water alarms and other devices applied to steam boilers.

Every steam boiler now in use, and every steam boiler made in the future should be subject to inspection and a "seal" put upon it, and a certificate with restrictions under which it may be worked furnished the owner, tampering with the one or exceeding the other to be visited with a severe punishment.

In France a manufacturer cannot put in use a steam boiler without a permit from the prefect of the department. In making an application for "license" to purchase and put to work a steam boiler, the manufacturer addresses the prefect on a government blank, furnishing the following information: Maximum pressure of steam under which the boiler is to work; horse-power and class of connected engine; form of boiler desired; location of boiler in relation to buildings and public highway; fuel to be burned; nature of business conducted in the establishment, and plan of location (on separate sheet).

The prefect of the department refers the application to the prefect of the arrondissement, who in turn refers it to the mayor of the commune; this officer then proceeds to an investigation *de commodo et incommodo*. The investigation is continued for ten days; five days after its termination the mayor addresses the *proces-verbal* of the investigation, with its recommendation in the premises, to the prefect of the arrondissement, who transmits it with his opinion to the prefect of the department. The prefect then lays the *proces* before the nearest government engineer, who examines and delivers an opinion upon which the decision of the prefect is based. The decree of 1810 (which as the writer is advised is still in force) in connection with an ordinance passed in 1843 relating to steam boilers, provides that the boiler shall be tested—first, at the shop where it is built; second, at the establishment where it is to be used—by the nearest government engineer, who, after inspection, furnishes the owner a certificate of condition and restrictions under which the boiler shall be operated. The tests are obligatory (except for mines) and give the manufacturer an immunity in the use of a steam boilers nowhere else approximated.

Under our system, or rather lack of system, the manufacturer buys and operates his boiler at his own option; if he desires to drive a forty horse-power engine with a twenty horse-power boiler, there is no law so far as the writer is aware to prevent his doing so.

The one great impediment to procuring a legal enactment relating to steam boilers is the general indifference of the public to the safety of human life. Take the preceding instance: If in carrying out the intention to drive a forty horse-power engine with a twenty horse-power boiler, the boiler "lets go," the public sympathy would be as great for the man who lost the boiler as for the men who lost their lives.

As an illustration of this, the writer would relate a circumstance happening several years ago:

A steam boiler, furnishing power to a very large agricultural machine shop, exploded with terrible violence, demolishing one entire section of the building, and killing and injuring several of the workmen; the writer, coming on the ground a few minutes after the explosion, saw the workmen bearing off the corpse of one of the victims. Shocked at the sight, and desirous of ascertaining the extent of damage to life and limb, he suggested to a bystander "that it appeared to be a very rough accident;" the response came in a suppressed tone, "It was rough on Smith, he would be obliged to buy a new boiler." In this instance six men were killed and perhaps twenty seriously injured. It may not be out of place to remark that this was one of those rare cases where the engineer enjoyed the princely income of "six dollars a week."

In nearly every instance of boiler explosion, it appears that the usual legal investigation of the causes of the accident is a mere "farce" that neither determines the real or proximate causes nor locates the blame where it properly belongs; and while the facts usually adduced at the inquest may form a foundation upon which the experienced engineer can build a theory of explosion, it is in the great majority of cases simply absurd to base a legal verdict upon the opinion of men whose knowledge of the steam boiler is of the most limited kind.

Several years ago a small cylinder boiler furnishing steam to a "digester" in a large soap and candle works in Cincinnati, suddenly "let go," killing the attendant and one of the factory hands on the spot; while a section of the shell, weighing upward of a thousand pounds, passed directly up two or three hundred feet, thence westward nearly half a mile, and fell killing three small children.

At the inquest it was ascertained that no one but the attendant was to blame, and as he was already dead, the coroner "generously forebore to prosecute him;" at the same time the facts in this case, as related to the writer by the previous attendant of the boiler, were such as to have condemned the proprietors to several years' penal servitude, under the "boiler law" of Prussia.

Coupled with the lack of legal inspection, the general location of boilers in many of our large manufacturing establishments is reprehensible in the highest degree. In the city of Cincinnati there is a certain establishment covering a superfice of 300x200 feet, and lifting skyward seven stories.

Each of the floors except the basement contains a small army of workmen and thousands of dollars' worth of costly materials and manufactured goods in various stages of completion. In the basement, about as central as posts and stone pillars would permit, is located the battery of boilers furnishing the power to drive the machinery. Let us suppose an explosion in this case, what would be the probable results? Is it to be imagined that any large portion of the several hundred workmen shut up in this miniature Vesuvius would escape whole? By no means. Let the slender threads now linking safety to disaster loose their hold, and the pent-up volcano would burst forth, pouring human lava through the vents. Such an occurrence would fall upon the community like a mantle of darkness, and great would be the desire to locate the blame somewhere. The coroner would assume an air of marvelous concern, and swear by the party that put him in office that the affair should be probed to the quick and the fault brought home to its father, "though angels weep." To this end a jury would be struck, composed of distinguished citizens, with a plentiful lack of information upon the questions to be brought before them, who after the usual delays would "on with the quest."

The picture may be highly colored, but the outlines are lifelike, as any one may verify who will read the testimony and verdicts of the inquests following appalling accidents.

The fall of the Dixon bridge, the breaking of the Mill River dam, the Ashtabula horror and the late total demolition of the Rockford court house, furnish excellent magazines of information upon the customary "legal" proceedings following these wholesale murders.

If we could have the inquest before the accident instead of after, how much better it would be; although this might seem "paradoxical," it is the spirit of the French law regulating the use of "steam boilers," and an explosion in that country is a rare event.

Iron Ship Building.—The Pall Mall *Gazette* prints some information touching the progress of iron shipbuilding in the United States. Five years ago England had a decided advantage over North America with respect to the cost of shipbuilding, the materials and the labor being much cheaper. But a great change has taken place in the meanwhile, for the price of American iron has fallen nearly fifty per cent., and the present rate is not much above that of the principal European markets, while copper is now produced in such quantities that it has become an article of exportation. The price of labor, which is the most important item in the construction of vessels, being estimated at seventy per cent. of the total cost of a steamer, has also been reduced by the use of machines which are not employed in England. The first iron vessel constructed in the United States was built in 1868, and since then two hundred and fifty-one ships of various dimensions, with a total tonnage of 197,500 tons, and valued at from £12,000,000 to £15,000,000, have been launched, this being an average of about thirty every year. These figures are very significant when placed beside those concerning the shipbuilding on the Clyde, but the United States' returns for the last four years show some very remarkable results. Thus the tonnage of vessels constructed was 224,000 tons in 1872, 266,000 tons in 1874, 270,000 tons in 1875, and 204,000 tons in 1876. Upon the other hand, there has been a rapid decrease in the number of screw steamers built on the Clyde since 1873—from 126 in that year to 113 in 1875, and to 83 last year. There has not been any decrease in the number of paddle wheel steamers, of which 16 were built last year, against 14 in 1872, and 10 in 1874.

Domestic Water Supply.

No one thing contributes more directly and vitally to the health, comfort and prosperity of a farmer and his family than a copious supply of good water. Indeed, the same may be said of all classes of persons conducting household affairs, whether they reside in town or country. Water, pure water, must be obtained, and in no stinted measure, if the health of man and beast is to be regarded. A family residing in the country ought never to be short of water; but then they often are, not only in midsummer but also in midwinter. Some farmers are content to live on from year to year with defective wells or springs which they know will fail three seasons out of four, and give them enormous trouble at the busiest time of the year. It is quite common to attribute this defective water supply to the nature of the ground or to unfortunate local peculiarities. But this is only the excuse of a very lazy or stupid man. The number of towns in this country where good water cannot, through some device, be obtained is very small. Water in abundance is found by boring upon sandy plains, and also upon lofty hills, and this resource seldom fails. If water can only be found in sure supply by digging 40 feet, it is folly to stop the pick and shovel when down but 20 feet, and yet this is often done.

We live in summer on the summit of a hill, more than two hundred feet above the level of the Merrimack River, close at hand, and yet we have a well which has never failed. It is 41 feet deep; we found water at 20 feet, but this did not prevent us from going 20 feet deeper, and the excessive dry seasons which have occurred since it was dug have proved the wisdom of the measure. We also have a cistern filled by roof water which holds 10,000 gallons; and beside these sources of supply we have a steam pump which gives us 2000 gallons of water an hour, from Lake Kenosa, 120 feet below our dwelling. This may look like needless labor and expense for water, and indeed it is under ordinary conditions, but we keep a half dozen fountains flowing, and the lawns and shrubs drink heavily every day in such times of drought as we are experiencing this summer.

In raising water for domestic uses from springs and ponds to high elevations, the steam-pump is the most desirable power to employ. We studied carefully all the various windmill devices, the air and gas engines, etc., but decided to lean upon the well-known and long-tried servant, steam, and in this we made no mistake. On a farm the cost is next to nothing to pump with steam, as there is usually a supply of old stumps or waste wood which will afford fuel, and any member of the family can build the fires and superintend the pump. Our reservoir, built of stone, holds 20,000 gallons, and four hours' pumping each week keeps it filled. Windmills, so far as our observation goes, are treacherous and unreliable devices. When one wants water most the winds won't blow, and then the power is feeble at best.

To secure a certain flow of water, the wells on farms must go down deeper, and if the ordinary suction-pump will not work put in the "submerged pump," so called, which is a force-pump that never freezes, and by it water can be raised to almost any altitude. We have two of them working with great satisfaction. Cisterns where roof water is saved must be made larger, and this is an important point. A family of five persons require a cistern holding at least 10,000 gallons. If it is only of 3,000 or 4,000 gallons' capacity, the family will be almost certain to be out of water in the heat of summer. If water is to be raised from lake, river, or spring in considerable quantities, use a steam-pump, and leave all other devices alone until further improvements make them better and surer than they are at present.—*Journal of Chemistry.*

Steam Motor for Street Cars in Ireland.—The British *Trade Journal* says: An interesting trial of Hughes' steam tram-car took place recently at Dublin, within the premises of the tramway company, at Rathgar; and although the space was limited, with many cross lines, which made the operations difficult, still, on the whole, the trial was eminently successful. The engine is inclosed within a tram-car of about 9 feet long, in appearance like a small railway carriage, and concealing effectually the machinery. The driver sits within the car beside the engine, protected from the weather, but having at the same time a complete view of the road through a glass window in front. The engine fire is fed by prepared coke, and once lighted a few pounds suffice for four or five hours. The boiler contains about 400 gallons, enough for ten hours' working. The engine itself has a condensing 8 horse-power, and consumes its own smoke, the car containing it being a veritable *multum in parvo*. During the trial the engine was several times pulled up within a length of 6 feet, and, with a tram-car attached, within 3 feet, thus disclosing a great facility in case of danger or accident. The invention appears to solve in a satisfactory manner the problem of utilizing mechanical power for street traffic, and all that is now required is that Parliament should deal with the question. In July, 1876, an ingenious invention for the same purpose was on trial in Paris, but nothing further was heard of that locomotive, and we must conclude that some objection was discovered which prevented its practical adoption. From a theoretical point of view it certainly appeared satisfactory enough.

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For each additional constituent of usual occurrence	1 50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur and Phosphorus in Iron or Steel	14 00
For each additional constituent of usual occurrence	6 00
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For determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charges will correspond with those for the constituents of an ore.

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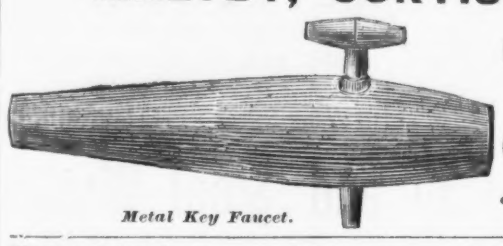

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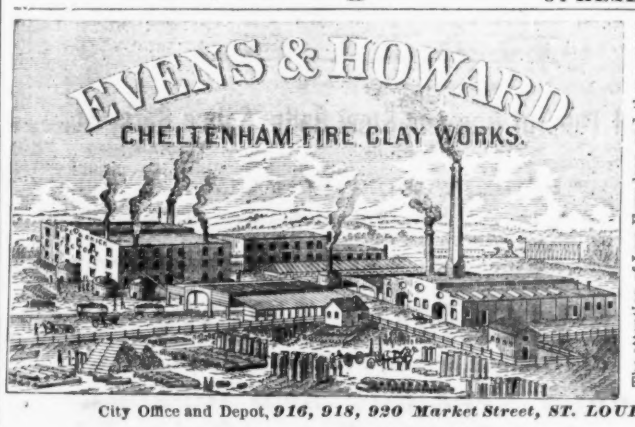

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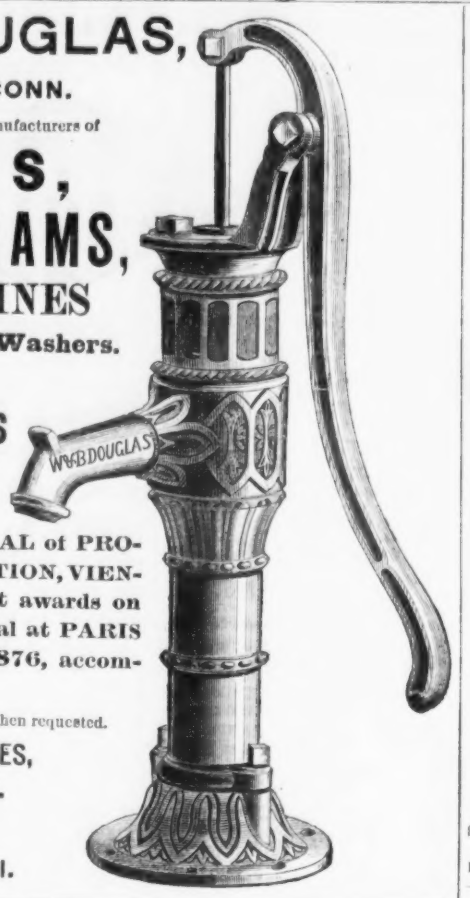

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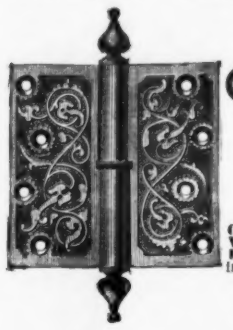

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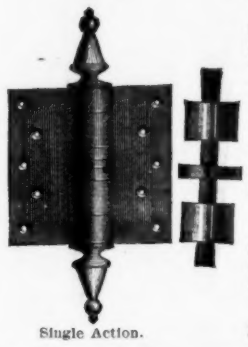

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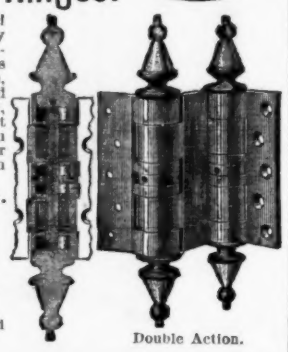

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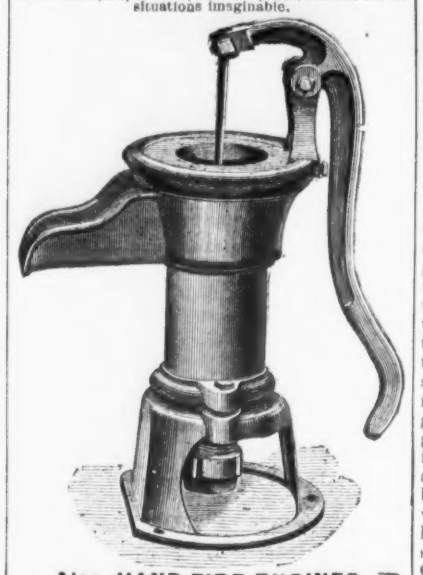

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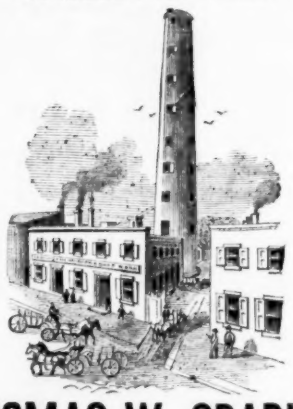

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Trade supplied.

Practical Iron Founding.*

BY EDWARD KIRK.

III.

LINING.

A 2-inch lining is heavy enough for a small cupola, and 6 or 8 inches is heavy enough for any sized cupola. In laying up a lining the brick should be placed closely together, so as to use as little mortar between them as possible; for, if too much mortar is used, it will crumble and fall out when the heat strikes it, and will leave openings through which the blast will escape. The best way to lay up a lining is to have a bucket full of thin mortar or grout and dip each brick into it as it is laid up. Each course of brick should be grouted between the brick and the caisson as soon as it is laid; if you do not grout between the brick and the caisson until 2 or 3 feet of brick have been laid up the grout may not run down to the bottom and will make a poor lining. When the lining is built 3 or 4 inches from the caisson it may be filled in with molding sand properly tempered for molding, and rammed in solidly. This sand is better than grout, for it will not crack when it dries, as grout will. Stone lining should never be put in, except when it is impossible to get brick, as they are expensive to lay up, and cannot be laid without using a great deal of mortar, which will soon fall out from the excessive heat, and the stone will crack from being suddenly cooled when the bottom is dropped. Common brick will stand the fire better than stone; the softer brick should be used. The lining should project out 1 or 2 inches just over each tuyere, to prevent the molten iron from dropping into the tuyeres. Some melters think that the caisson is air-tight and the blast cannot escape, and it does not make any difference if it does get out through the lining. These melters should remember that they are not trying to melt down the lining, but the stock, and all the blast that escapes up through and back of the lining is cut off from the stock and is lost. A good fire-brick lining should last from one to two years, according to the amount of iron melted, and the way the lining is daubed and kept up. There is nothing gained by keeping a lining in too long, as it will become shaky; the blast passes up through and behind it instead of passing through the stock, and more fuel is required to make hot iron.

FIRE-BRICK.

For lining cupolas and furnaces the selection of a proper description of fire-brick is a matter of considerable importance, and the foundryman should be careful to select the best brick regardless of expense, for a few more dollars on the thousand is nothing when compared with the consequences of using cheap and inferior brick, which will be costly at any price. From the great wear and tear upon them, and from the delay and loss caused by the often-repeated stoppages for repairs, it is the wisest and best economy to always use the best fire-brick that can be procured. I shall not enter into the merits of the fire-brick manufactured by different companies, but I should recommend the use of the white or softest brick as being the best for standing the fire; and in lining up a cupola the softest brick should always be selected for the bottom, where the heat is greatest, and hard also for the top, where the lining is liable to be struck and broken by throwing in the iron and fuel. The wedge or circular brick is better for lining cupolas than the straight brick, as they can be laid closer together and require less mortar, and will make a better and more solid lining that will last longer.

TUYERES.

The tuyeres in a cupola should be put in at equal distances apart, and they should be so arranged that each one of them will admit an equal amount of blast into the cupola. A tuyere should never be put into a cupola directly over the tapping hole, and if the tuyere is a continuous one, as is the McKenzie, it should be stopped up over the tapping hole. The height of the tuyeres from the sand bottom will vary according to the class of work that the cupola is intended for. In stove foundries, where the iron is drawn out as fast as it is melted, the tuyeres are put in very low; but in a machinery foundry, where it is desirable to hold the molten iron in the cupola for a large casting, the tuyeres are put in higher; but the low tuyeres are the best for making hot iron, and for continuous melting. In all of our large stove foundry cupolas the tuyeres are put in only 2 or 3 inches above the sand bottom, and in some of them the tuyeres are so low that the sand bottom is slopped clear up to the bottom of the tuyere. When the tuyeres are put in low the melting point of the cupola is lower, and less fuel is required for the bed, and the bed is easier to keep up in a long, continuous heat. The tuyers should never be put in more than 10 or 12 inches above the sand bottom, for the cupola will not make as hot iron, and it is almost impossible to keep the bed up for a long, continuous heat. The old style of having one tuyere hole above another, and raising the tuyere pipes as the cupola fills up with molten iron, and stopping up the lower tuyere holes with clay, has generally been abandoned as a failure; for, after the cupola has been filled up with molten iron in this way, and the iron drawn out, the stock will generally settle so that the cupola is of no account for further melting; and for a long, continuous heat it is better to draw out the iron as fast as it is melted, and hold it in a ladle, if necessary. I should recommend low tuyeres in all cases for making hot iron and saving fuel. The foundryman must use his own judgment as to how many tuyeres to put into his cupola, but he should put in enough to distribute the blast equally through the stock, and no cupola should have less than two tuyeres or one continuous one.

DIFFERENT SHAPED TUYERES.

There are a great many different shaped tuyeres or openings in the lining for admitting the blast into the cupola, and I will now describe some of the principal ones in use that give good satisfaction. The oldest tuyere in use is the common round tuyere, and it gives good satisfaction when put in right.

The tuyere (Fig. 1) is a cast iron frame, with a slot or opening in it 2 inches wide by 10 or 12 inches long. This tuyere was in use in Davis' stove foundry in Cincinnati, Ohio, in 1874, and gave good satisfaction.

The T shaped tuyere (Fig. 2) is a cast iron frame, with a slot or opening at the bottom 2 inches wide by 8 inches long, with an upright slot 2 inches wide by 10 or 12 inches long. This tuyere was in use in the stove foundry of Readway & Burton, in Cincinnati, Ohio, in 1875, and appeared to give good satisfaction.

Fig. 1.

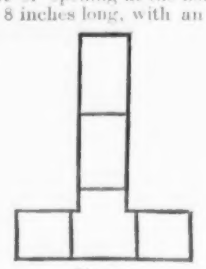

Fig. 2.

The tuyere (Fig. 3) is a slot 1 inch wide, running one-third of the way around the cupola on each side, with four upright slots, each 1 inch wide and 10 or 12 inches high. This tuyere may be made as a cast iron frame, or be formed in the brick lining; it was in use in the foundry of Griffith & Wedg, Zanesville, Ohio, in 1873, and gave good satisfaction. A cupola 40 inches in diameter, with two of these tuyeres in, would melt five tons of iron per hour.

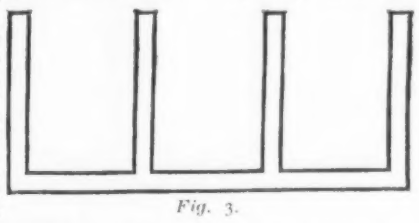

Fig. 3.

The tuyere (Fig. 4) is a slot tuyere 1 inch or more wide, and running one-third of the way around the cupola on each side; or it may be connected and form a continuous tuyere all around the cupola. These tuyeres are made by taking two iron plates and laying small blocks of iron between them, as shown in Fig. 4. This tuyere was in use in a hollow-ware foundry in Alleghany City, in 1874, and appeared to give good satisfaction.

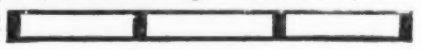

Fig. 4.

The tuyere (Fig. 5) represents a tuyere that is in use in some of the foundries in Philadelphia and New York. It is said to give good satisfaction.

The tuyere (Fig 6) is an oval-shaped cast iron tuyere; it is generally laid flat, as shown in Fig. 6, and is made large or small to suit the size of the cupola. This tuyere is in general use in the Troy and Albany stove foundries, and is said to be a good tuyere.

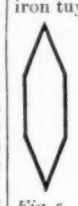

Fig. 5.

The tuyere (Fig. 7) is the Lawrence patent reducing tuyere. This tuyere is made of cast iron, and is a cast iron frame with a large opening at the bottom, and an upright slot, reduced to nothing, at the top. The large opening is about 3 inches in diameter, and the slot is 10 or 12 inches long. This slot is 1 inch wide at the bottom, and tapers to nothing at the top. This tuyere gives good satisfaction when it is in proper shape; but the upright slot is liable to collapse from the heat, as it is too small to admit enough blast to keep it cool. This tuyere would do better if it was made of fire clay.

The tuyere (Fig. 8) is a reducing tuyere, and is merely one round opening above another. They are put in two or more inches apart, and three or more may be put in, in a row, and each one gets smaller toward the top. This tuyere is used in the Truesdale patent cupola; but I do not know whether Mr. Truesdale has a patent on the tuyere or not.

Fig. 6.

Fig. 7.

The tuyere (Fig. 9) represents a triangle-shaped tuyere that is used in some of the Cincinnati foundries; it is a cast iron frame,

Fig. 8.

Fig. 9.

set in the brick lining, and may be made as an equal triangle, or it may be a little higher than it is wide, so as to bring it up to a sharp point at the top. I think this a good tuyere, for the sharp point at the top cuts the blast at the top, and it is not so liable to form a bridge over the tuyere as the round or oval-shaped tuyere is; and I should recommend this tuyere in preference to all others, especially for small cupolas.

(To be continued.)

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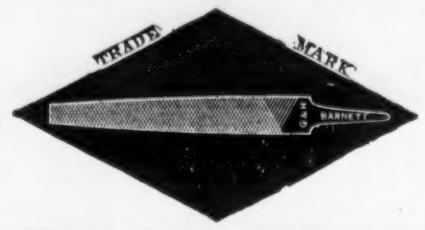

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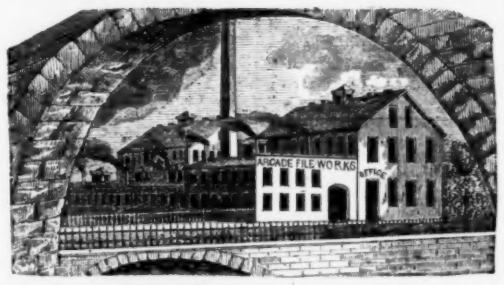

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Wagon Box Rods,

With *wrought* Nut and Washer, together with *Patent Shoulder*, making a perfect bearing, and also clasping the eye so it cannot be twisted out of shape. The eye is bent at a cherry red heat—therefore the iron at the base of the eye is not *burnt* or injured.

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In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

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For Boring PUMP LOGS. All sizes in stock. **Socket Shanks, Ring Handles, and Connecting Rods** for the above to order. Also **Tenoning Tools** for joining log ends. **Coopers'** and **Slaters' Tools.** Tool Chests. Tools for all trades a specialty.

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AUSABLE HORSE NAILS

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The Ausable Nails

Are Hammered Hot,

And the Finishing and Pointing are Done Cold,

Thus Imitating the Process of Making Nails by Hand.

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Molding and Finishing Nails, with or without heads. **Brush Makers', Upholsterers', Cigar Box, Basket, Chair and Undertakers' Finishing Nails** a specialty. **Shoe Nails of Brass and Iron. Bright Iron Rivets. Brass and Iron Escutcheon Pins,** with flat, round and fancy heads, all sizes on hand and to order.

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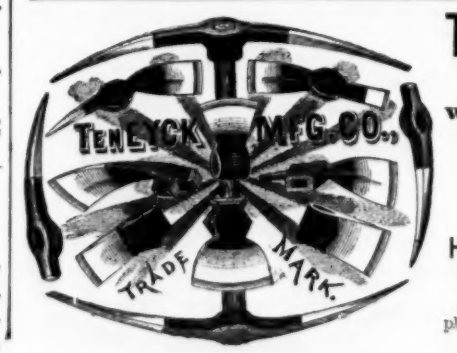

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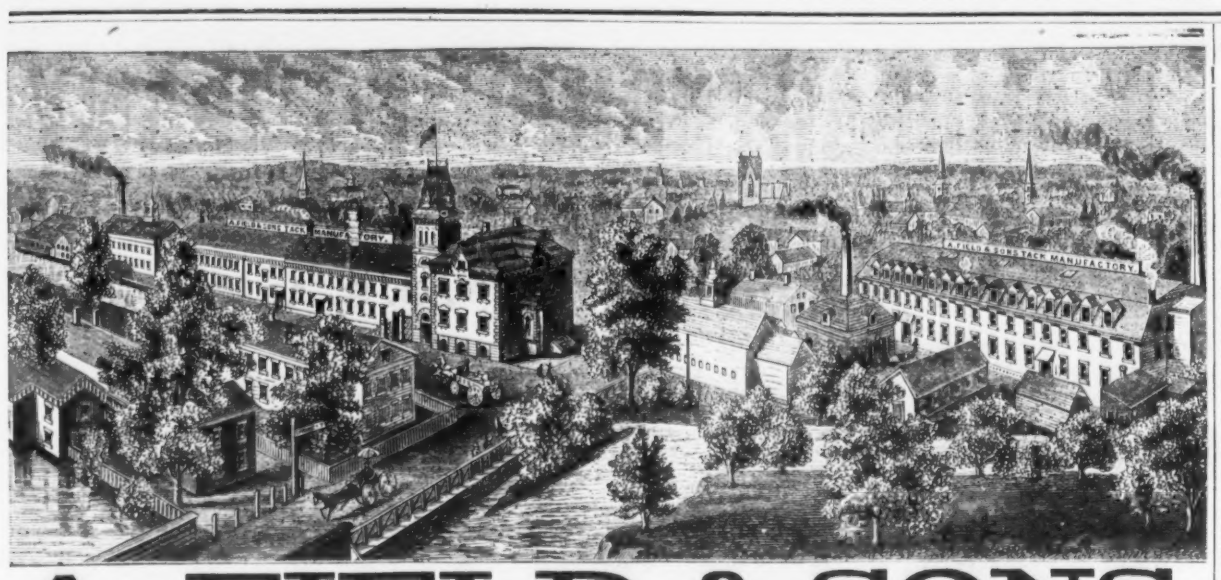

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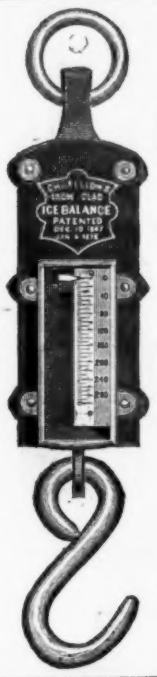

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Hardware & Tools and Specialties in Metals manufactured to order.

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STEEL SHUTTERS,

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Rolling Wood Shutters

Of various kinds. Clark's Shutters are the **Best** and **Cheapest** in the world. Are fitted to new *Tribune* Building, Lenox Library, Delaware and Hudson Canal Co.'s Building, Transatlantic Steamship Co.'s new Dock, American News Office, &c., Posey County Court House, Mt. Vernon, Holt County Court, Oregon, Mo. Also to buildings in Boston, Cincinnati, Detroit, Janesville, Wis., Baltimore, Canada, &c. Have been for years in daily use in every principal city throughout Europe, and are indorsed by the **Leading Architects of the World.**

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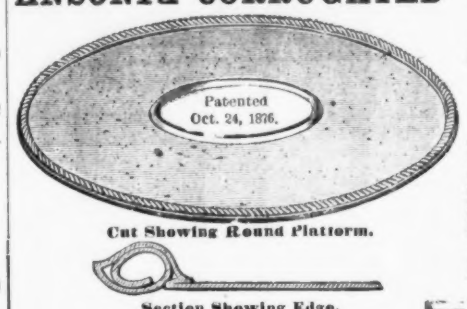
162 & 164 West 27th Street, N. Y.

ANSONIA CORRUGATED STOVE PLATFORM



Cut Showing Round Platform.

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The Ansonia Corrugated Stove Platform, with its heavy figured ogee border, is believed to be the best Platform offered to the trade. As shown in the illustrated section herewith it requires no nailing to keep it in place or to prevent it from turning up at the edge; while the metal is of sufficient thickness to require no lining.

The low price, superior quality and fine finish of this Platform will be readily acknowledged. Packed 24 in a case.

Send for price list.

ANSONIA Bronzed Fire Screen,

With Ornamented Mouldings.

PATENT APPLIED FOR.

The Portable Bronzed Fire Screen or Shield, as shown in the illustration, is especially designed for the safety and protection of walls, furniture, woodwork, paper or varnish from heat.

Being constructed of metal, with firm and substantial edges, curved in form to stand alone, it may be easily adjusted to any position about a stove, before a grate or fire place. The demand for something useful, durable and ornamental as a Fire Screen has long been felt, and having finally accomplished the desired result, we are prepared to fill all orders promptly.

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SUPPLIES, in every variety,

For Railroads, Mills and Manufacturers.

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A General assortment of

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For the country trade constantly on hand.

JOHN I. BROWER & SON, 288 Greenwich Street, New York.

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POCKET VERNIER CALIPER,

MANUFACTURED BY

Darling, Brown & Sharpe,

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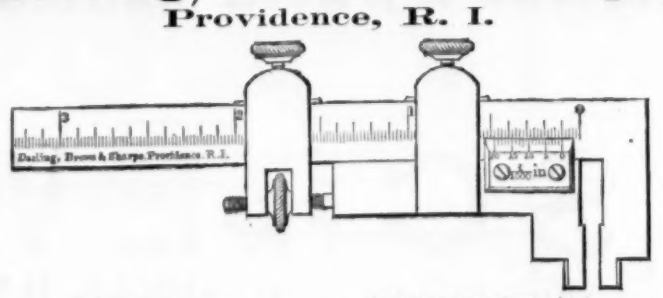

Price, $10. - - - In Morocco Case, $11.

The above cut is a fac-simile of one side of our hardened Cast Steel Improved Vernier Caliper, a light, convenient and valuable instrument for machinists' and tool makers' use in obtaining correct measurements. The side represented above is graduated upon the bar to inches and fiftieths of an inch, and by the aid of a Vernier is read to one-thousandths of an inch. The opposite side is graduated to inches and sixty-fourths of an inch. The outside of the jaws are of suitable form for taking inside measurements, and when the jaws are closed measure 250 one-thousandths of an inch in diameter. This caliper will measure one inch and eleven-sixteenths, outside diameter, when the jaws are open full size.

FRENCH MEASUREMENTS.

These instruments can be furnished with millimetres (in the place of sixty-fourths of an inch), and provided with a vernier to read to one-fortieth of a millimetre.

Our First Imported Locomotive—the Stourbridge Lion.

A correspondent of the New York *Times*, writing from Honesdale, Pa., collects the following facts in regard to the "Stourbridge Lion," the first imported locomotive, some remains of which were on exhibition at the Centennial:

On August 8, 1829, forty-eight years ago to-day, the first locomotive that ever turned a driving wheel on a railroad track in America, was run on the newly-finished road that connected the Lackawanna coal fields with tide-water on the Hudson, by way of the Delaware and Hudson Canal. The road in question was the first of any general commercial importance ever built in this country, and inaugurated the economical system of inclined planes since adopted by engineers wherever practicable. Up to the 8th of August, 1829, there were only 12 miles of railroad in operation in America—three miles of a five-foot gauge running from the Quincy granite quarries to the Neponsett River, in Massachusetts, and the novel "mule road," nine miles in length, connecting the Summit Hill Coal Mines, back of Mauch Chunk, with the Lehigh River. The road between Honesdale and Carbondale was 16 miles in length and was the result of the enterprise and persistency of Maurice and William Wurtz, the pioneer coal operators of the Lackawanna Valley, who introduced the first anthracite coal into New York city. Railroad building was, at the time mentioned, just beginning to awaken interest among capitalists. The first great enterprise of the kind—the Liverpool and Manchester Railway in England—had been in process of construction some time, and was approaching completion. George Stephenson, the father of steam locomotives, was struggling with the managers of that company for the introduction of steam as a motive power on the road. His experiments had attracted attention in this country. Pending the decision as to whether locomotives should be used on the Liverpool road, Horatio Allen, who had been Jervis' assistant engineer in the construction of the Delaware and Hudson Canal, went to England to examine into the merits of steam as applied to transportation on railroads. He was satisfied that Stephenson's idea would revolutionize all branches of commerce, and, acting on his judgment, Mr. Jervis, by authority of the company, commissioned him to purchase three steam locomotives for use on the pioneer road of America. George Stephenson was at the time busy in preparing his subsequently famous engine, the "Rocket," for trial on the Liverpool and Manchester Railway. Allen contracted, therefore, with other machinists—Foster, Rastwick & Co., of Stourbridge—to construct the machines for the American company. About the middle of May, 1829, one of them reached this country in the ship John Jay, and was landed at the foot of Beach street, New-York. The West Point Foundry Yard was then at the foot of that street. Horatio Allen put the machine together, and blocking its wheels clear of the ground, exhibited its workings by means of steam generated with coal that had been brought from the mines the engine was intended to transport coals from. For six weeks the wonderful machine was visited by thousands. Then it was sent up the North River to Rondout, and from there forwarded in boats up the canal to Honesdale.

The intention of the company had been to open the road and canal, and celebrate the running of the locomotive on the Fourth of July, 1829, but the work was delayed so that it was not ready for use until the 1st of August. The locomotive had arrived on the 23d of July. When the road was in readiness the engine was set up on the company's coal dock, under direction of Mr. Allen. This primitive railroad track consisted of hemlock rails, eight inches by ten in thickness, placed four feet three inches apart, and spiked to hemlock ties, with a space of ten feet between them. The timber had not been well seasoned, and being put down under a midsummer sun, was warped and twisted out of all regularity by the time the trial of the locomotive was to be made. The road ran for nearly a quarter of a mile along the coal docks, facing the village, which had sprung suddenly from the wilderness at the beck of the canal, and had been named Honesdale, in honor of Philip Hone, formerly Mayor of New York, and a patron of the great coal enterprise. After quitting the docks the track turned abruptly to the West by a curve of most threatening radius, and crossed the Lackawanna River over a hemlock trestle, nearly 100 feet high. When the ponderous locomotive was placed on the track, the impression became general that it was too heavy to be borne by the hemlock rails, and Mr. Allen was importuned by many prominent men among the vast assemblage of spectators not to attempt the crossing of the trestle. He saw the great danger at a glance, but feeling that locomotive power on railroads was destined to become universal in years to come, the pride of possessing the distinction of having been the man to direct the energies of the first one on the continent, overpowered his sense of danger, and he declared that he would make the trip, let the consequences be what they might. He steamed up the engine, and after running it slowly backward and forward on the dock in sight of the assembled hundreds for a few minutes, he pulled the throttle-valve open, and shouting a loud "good bye" to the crowd, dashed away from the village, around the curve, and over the shaking and swaying trestle at a rate of speed estimated at 15 miles an hour. He ran several miles up the track, and then returned to the village amid the shouts of the populace and the booming of cannon. Although the locomotive, as a locomotive, was a perfect success, the railroad was not calculated to stand its use, and the expense of adapting it to the weight of the locomotive being too great to call for consideration at that day, the engine was "housed" in a shanty on the dock, where it lay for years, a prey to neglect and decay. Its boiler was finally taken to Carbondale, where it is in use and excellent order to-day. The pump was used by an employe of the company for several years, and was at last washed away by a freshet and lost. The rest of the machinery was broken up and sold for old iron. The two other locomotives shared the same fate. Only one or two relics of the pioneer locomotive of America are in existence to-day. The engine was called the "Stourbridge Lion," from the place of its manufacture. The machine weighed seven tons; four tons being what the contract called for. There were four wheels connected by side-rods. Vertical cylinders on each side of the rear end of the boiler communicated motion to a huge walking beam, connected with the side-rods of the driving-wheels by other long rods. The engine was covered with rods and joints, and its appearance was that of a great grasshopper. John B. Jervis, who ordered the locomotive, and Horatio Allen, who ran it, are still living, one in Rome, N. Y., the other in New York city. Both have since achieved some of the greatest engineering triumphs this country has known.

There is another interesting and important fact connected with the running of the "Stourbridge Lion." The successful application of steam power to railroads has always been dated from the trial of Stephenson's "Rocket," Eriesson's "Novelty," and the "Sans Pariel" and "Perseverance," in Liverpool, on the 14th of October, 1820. The 'Stourbridge Lion,' demonstated two months before, in a remote and isolated part of America, that the idea was a grand success.

Fire-Escapes.

In a recent issue of *The Iron Age* we had occasion to criticise very severely inventors of fire-escapes and other apparatus for saving life, who often produced man traps, thus destroying instead of preserving life. Since that time we have had our attention called to a most criminal piece of carelessness in the use of fire-escapes, by which one man, at least, is reported to have lost his life and another to have been seriously injured. The carelessness or neglect is of a kind not unlikely to happen again, and it should therefore receive the more careful attention. One of the large buildings recently burned in New York city was provided with two of Mr. John S. Cochran's chain fire-escapes. These are so arranged that when a person takes hold of the chain, which passes over a pulley at the roof, he can descend to the ground safely, the speed of the chain being regulated by a clutch. It is necessary of course that the whole length should be free to move. In the building we mention, which was very high, there were two of these escapes, one of them was very fortunately in order; the other, in a distant part of the building, was, through the criminal carelessness of those in charge, fouled by a pile of lumber placed against the chain so that it could not move. We have heard that the inspector of fire-escapes ordered the removal of the lumber, and that the inventor of the escape pointed out the danger of leaving the chain inoperative. No attention was paid to these cautions, and the escape when most needed was almost valueless. One man was saved by it, but his hands were badly injured, while another is said to have been unable to use it and was lost. How many others were left above to perish in the flames does not appear. Contrasting this with the service which the escape could have rendered, only makes the criminal carelessness appear in a stronger light. The other escape, it seems, was fortunately in good order, and more than 60 persons escaped by means of it. If we mistake not, some eight or ten men were upon the chain at one time, according to the testimony taken at the coroner's inquest. We have a note from one of the men who escaped, saying that he saw from ten to fifteen men upon the chain at once. It would seem from this that one of the fire-escapes would have been ample had it been accessible form all parts of the building. But to place a life-saving apparatus in a place where it may be wanted and then allow it to become useless, is a crime. It is frequently the means of destroying life by the waste of valuable time in attempting to make the apparatus work, and when its useless character is discovered escape by other means has become impossible. When a fire-escape is put on a building it should always be kept in perfect order. It will not answer to put a fire-escape in order and thus depend upon chance for keeping it so. Frequent inspections and tests are necessary, and thus every occupant of the building who, by any possibility, could have occasion to use the apparatus, must know how it is to be used. The knowledge of a certain and easy way of escaping from fires does wonders toward stopping a panic among workpeople, and prevents them from jumping from windows from fright or excitement; and at the same time, by rendering them cool and collected, enables them to give much more efficient aid in controlling a fire in its early stages.

The strike of the laborers at the works of Jones & Laughlins, Pittsburgh, has ended, after lasting for eight weeks, in the strikers resuming work on the terms proposed by the company. The strikers were brought to terms by a committee of the Amalgamated Ironworkers' Union, who informed them that they had not sufficient grounds for their strike, and advised them to go to work, which advice would have been much more sensible had it been given eight weeks ago. This is another illustration of the folly of strikes. After an idleness of eight weeks and a loss in wages of $185,000, they suddenly discover, after being told so a thousand times, that they have no grounds for their strike, and they go to work with the debts of eight weeks as a burden they must stagger under for months. We will look with interest to see what those papers who have warned everybody to stay away and ranted about striking for their rights will have to say in regard to it.

Dr. Engel, the director of the Bureau of Statistics at Berlin, estimates the loss in capital of every German soul emigrated at 650 thalers (Prussian) or £97 10s. In illustrating the loss to Germany by emigration, Dr. Engel points out likewise that the old and infirm people do not emigrate, but that Germany has given within 27½ years considerably over 1,000,000 of strong men to the United States of America alone, and that the Kingdom of Prussia has lost within the same time 500,000 soldiers.

RUSSELL & ERWIN MANUFACTURING COMPANY

Manufacturers of HARDWARE.

FACTORIES, - - - - NEW BRITAIN, CONNECTICUT, U. S. A.

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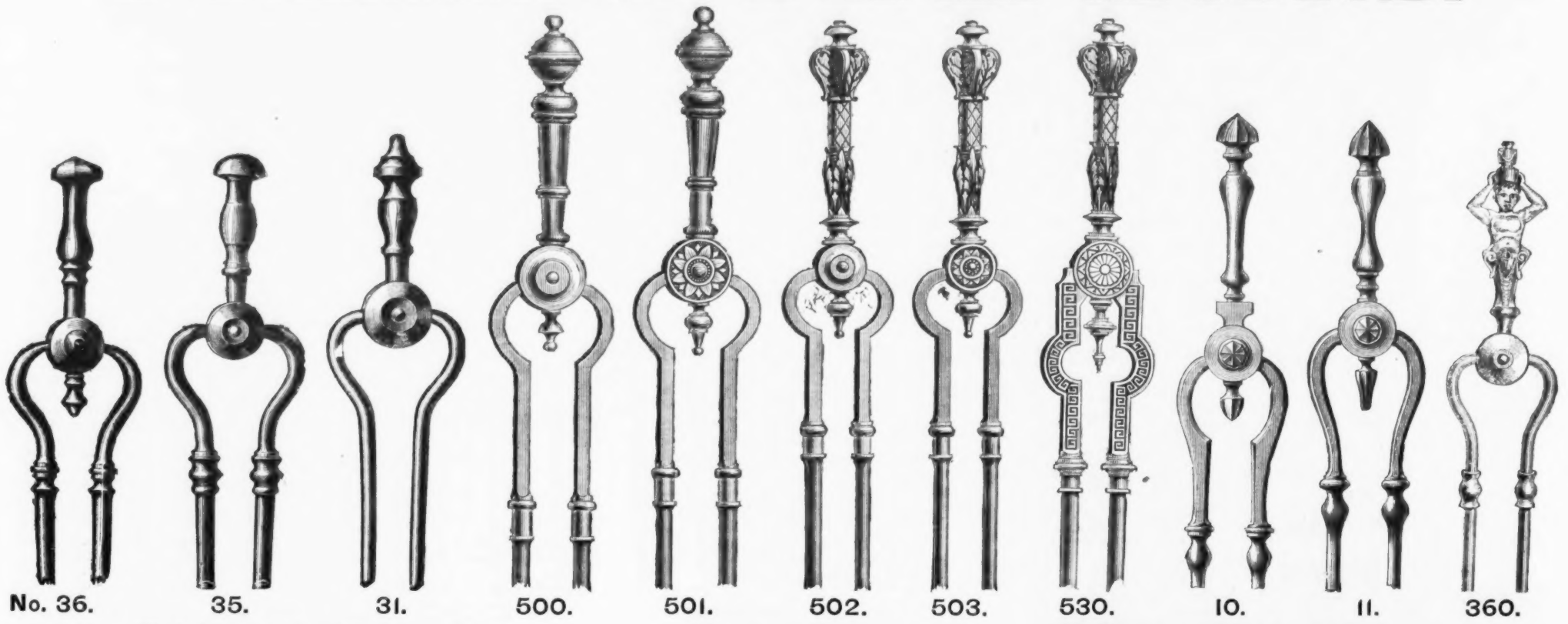
POLISHED FIRE IRONS.



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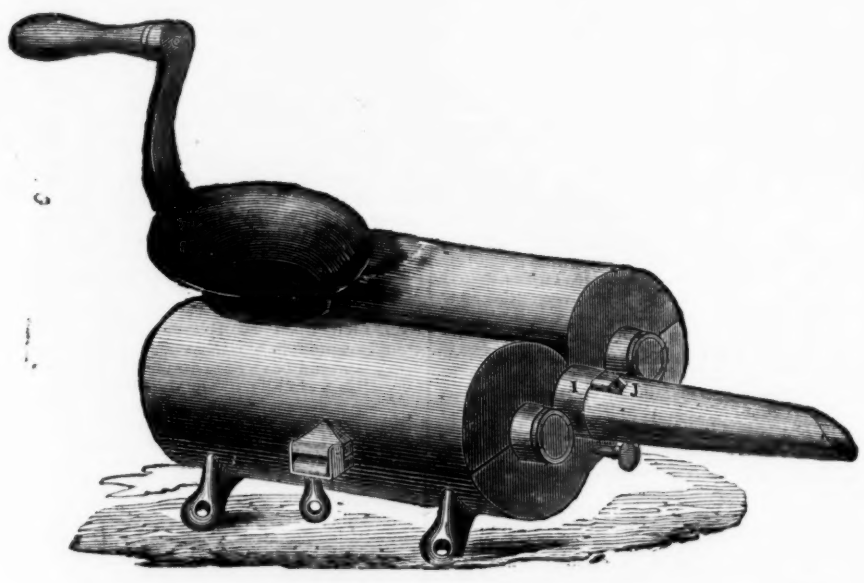
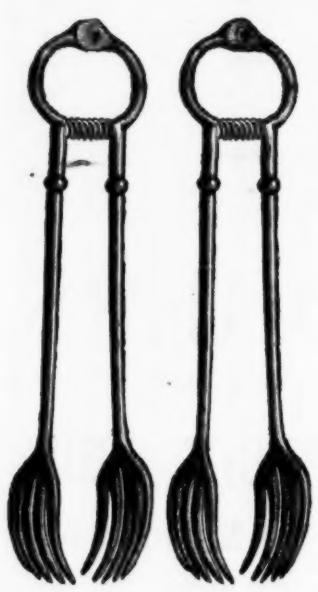
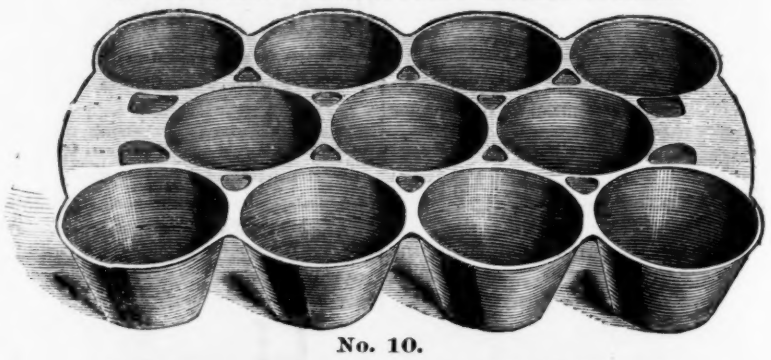
Hale's Patent Meat Cutter. **Coal Tongs.** **Waterman's Patent Bake Pans.**







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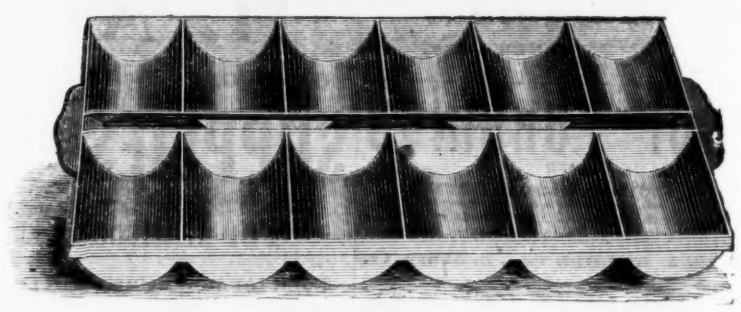

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Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of **PEN AND POCKET CUTLERY,**

Solid Steel Scissors, Shears, Razors, Russia Leather Strops, Hones, &c.

Sole proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"

And the celebrated **"ELECTRIC SHEARS."** Nickel Plated Hows.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.

91 Chambers and 73 Reade Sts., N. Y. **423 N. Fifth St., ST. LOUIS, MO.**

MERIDEN CUTLERY CO

MANUFACTURE ALL KINDS OF TABLE CUTLERY,

EXCLUSIVE MAKERS OF THE

"PATENT IVORY" OR CELLULOID KNIFE,

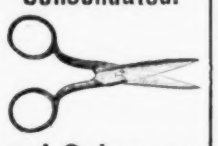
The most Durable **WHITE HANDLE** known. **THE OLDEST MANUFACTURERS IN AMERICA.** Original Makers of **The Hard Rubber Handle.**

Always call for "Trade Mark" "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all Dealer in Cutlery, and by the **MERIDEN CUTLERY COMPANY,** *49 Chambers Street, New York.*

THE LAMSON & GOODNOW MFG. CO.

The Miller Bros. Cutlery & U. S. Steel Shear Co.'s "Consolidated."

Centennial Award for best Quality and Finish.



Pocket Cutlery and Solid Steel Shears and Scissors.

J. C. WILSON & CO., 81 Beekman St., New York Agents.
E. L. COOPER, 48 Warren St., New York Special Agent.

THE MILLER BROS. CUTLERY CO., West Meriden, Conn.

NAUGATUCK CUTLERY CO.,

Manufacturers of FINE PEN & POCKET CUTLERY.

FULLER BROS., Sole Agents, 89 Chambers and 71 Reade Sts., N. Y.

Cutlery.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.

CORPORATE MARK.

Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

Established 1853.

AMERICAN SHEAR CO.

Manufacturers of

Pen and Pocket Cutlery,

Shears, Scissors and Pruning Shears,

HOTCHKISSVILLE, CONN.

Salesroom, **298 Broadway, New York,** with LANDERS, FRARY & CLARK.

ESTABLISHED 1853.

AARON BURKINSHAW,

Manufacturer of **Pen and Pocket Cutlery,** Pepperell, Mass.

My Blades are forged by hand from the best Cast Steel, and warranted. To me was awarded the Gold Medal of the Conn. State Agricultural Society.

Cutlery.

JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm & Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c

AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark.

)NO SPENCER ROTHERHAM

Granted 1777.

F. W. HARROLD,

Birmingham and Sheffield,

ENGLAND.

Importer on Commission

OF

HARDWARE, CUTLERY, GUNS, &c.

W. SANDERS, Agent,

76 Reade Street, N. Y.

VAN WART, SON & CO.

Hardware Commission Merchants,

EXPORTERS AND IMPORTERS,

BIRMINGHAM, - ENGLAND,

Agents,

McCOY & COMPANY,

134 & 136 Duane Street, N. Y.

George H. Gray & Danforth,

48 India Street, Boston.

F. W. TILTON,

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Rimmer & Son's Celebrated Harness and other Needles.

W. Clark's Genuine Horse Clippers.

Seydel's "Ashantee" Pocket Hammock

McCOY & COMPANY,

BORAX A SPECIALTY,

134 & 136 Duane St., New York.

HALL, ELTON & CO.,

Electro Plated Ware, German Silver and Britannia Spoons.

THE "ORLEANS."

Factories, Wallingford, Conn. **Salesroom, 75 Chambers Street, New York.**

Young's Patent Folding Scissors.

Fac simile of the small size.

These Scissors are made of the very best steel, nickel plated, and so constructed that they can be readily folded and carried in the pocket without injury to the garments. A sample pair will be sent by mail, *to the trade only*, upon receipt of the retail price, namely:

For small size, either blunt or pointed..... $1 00
Large size, pointed or half pointed..... 1 50

New York, Feb. 1st, 1876.

MARX BROS., Proprietors,
430 Broadway.

ALFRED H. HILDICK,

12 Warren St., N. Y., Importer of

Birmingham Heavy Hardware, Chains, Anvils, Vises, &c.

Agency of HILL BROS. & CO., WALSALL, ENGLAND, GENERAL HARDWARE MERCHANTS,

And of

Ball's Pat. Solid Steel Sheep Shears.

These Shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use, either in the bow or at the junction of stock and blade. Samples can be seen at above address, or sample lots furnished. Depot for "THE CROWN" SOLID BOX VISES. A cheap and excellent Vise.

A. F. PIKE,

East Haverhill, New Hampshire,

Manufacturer and Wholesale Dealer in

Scythe, Axe, Knife and Hacker

STONES.

LETOILE,
UNION,
PREMIUM,
DIAMOND GRIT,
WHITE MOUNTAIN,
INDIAN POND (red ends)

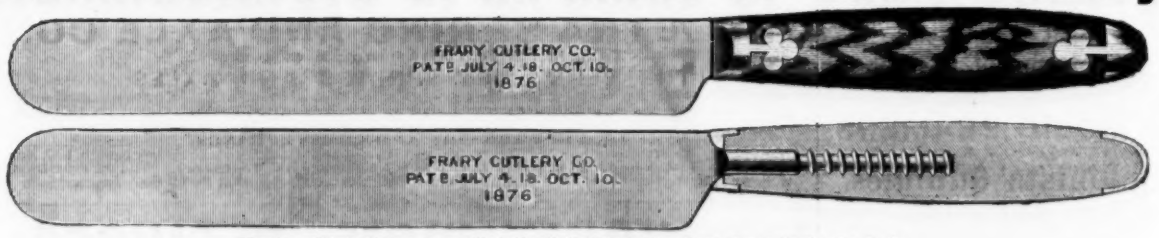
Stones gotten up or labeled in any style desired. Price and quality guaranteed.

Our Stone are of good keen grit and *will not glaze.*

THE FRARY CUTLERY COMPANY,

FACTORY, Bridgeport, Conn. *NEW YORK OFFICE & WAREHOUSE, No. 83 Chambers St.*

Manufacturers of all kinds of Table Cutlery.



The above Illustrations represent their New Patent Screw Tang Lock Fast Solid Handle Knife.

There is no question but that a solid handle Knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent screw tang. A wood screw is welded to the tang of the Knife or Fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong neat and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butchers and Carvers, and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly, and very respectfully invite the attention of the trade.

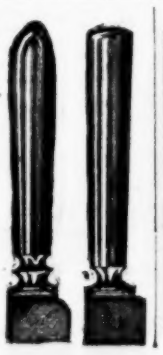
SILVER PLATED SOLID STEEL HANDLE KNIVES.

We guarantee 12 dwts. of fine silver on each dozen of Table or Medium Knives. All our Spoons, Forks, &c., made of 18 per cent. Nickel Silver. We warrant our extra plate

On TEA SPOONS	2½	ounces	per gross.
" DESSERT SPOONS	3¾	"	"
" TABLE SPOONS	5	"	"
" DESSERT FORKS	3¾	"	"
" MEDIUM FORKS	5	"	"

THE ROGERS TRADE MARK CUTLERY CO.

P. O. Box 204. **HARTFORD, CONN.**



HAGSTOZ & THORPE.

MANUFACTURERS OF ROSSELLS PATENT

PARALLEL PLIERS

EDGER BUILDING PHILA.

The English Post Office.—Facts and Figures.

The report of the Postmaster-General for 1876, just issued, states that the total number of letters which passed through the post offices in the United Kingdom during that year was 1,018,955,200, equal to 31 letters per head of the population; the number of post cards was 92,935,700; and of newspapers and book packets 298,790,800, of which the newspapers alone numbered 125,065,800. The number of registered letters wat 5,095,116. One of these letters, addressed to a bank and containing £3000, was found to be unfastened. The number of returned letters was 5,897,724. Upward of 33,100 letters were posted without addresses, and of these 832 were found to contain nearly £390 in cash and bank notes, and nearly £5000 in checks; 78,575 postage stamps were found loose in different post offices, having been insecurely fixed, and 14,346 articles were found without covers. In a newspaper which reached the Returned Letter Office were found to be inclosed four sovereigns, and in another a gold locket. The senders of newspapers very often infringe the regulations by sending unauthorized articles of various kinds concealed between the folds. Of such inclosures, the following among others were observed: Cigars and tobacco, collars, seaweed, ferns and flowers, gloves, handkerchiefs, music, patterns, sermons, stockings, lace, postage stamps and money. During the 15 months ended march 31st last no less than 593 registered letters were returned to the countries of origin in consequence of their containing coin or jewelry contrary to the provisions of the General Postal Union. Of these more than three-fourths were from the United States.

The post office continues to be made the medium for the transmission of small articles of almost endless variety. Among others were the following articles: Musical instruments and cutlery, artificial teeth and eyes, wigs, flowers, fruit and vegetables, game and fish, medicine and perfumery, articles of dress, leeches, frogs, snakes and lizards. Several of these, however, being prohibited articles, were sent to the Returned Letter Office. A live snake, which had escaped from a postal packet was discovered in the Holyhead and Kingstown Marine post office, and at the expiration of a fortnight, being still unclaimed, it was sent to the Dublin Zoological Gardens. A packet containing a live horned frog reached Liverpool from the United States, and was given up to the addressee, who called for it. Another packet, also from America, reached the Dublin Post Office, containing two live lizards, and was similarly given up to the addressee on personal application. Complaints of the alleged loss of letters are not unfrequently made, and much trouble given to the department in investigating them, when the letters inquired for have not been posted at all. In one case it was stated that a letter, containing £95 in bank notes, had been lost, but upon the complainant being closely questioned he admitted that his statement was untrue, and that it was invented to stave off for a few days the importunities of a creditor. In another case complaint was made that a letter addressed to a "naturalist" had failed to reach its destination, but it was afterward found in a cage on the premises of the addressee, where it had been placed by a monkey.

Water Meter Claim Against the City of New York.—The following appeared in one of the daily papers, during the present week, in regard to the well-known water meter suit against the city of New York: "In the suit of Jose F. Navarro, through his representative, John Bayard, against the city, which has occupied the attention of ex-Judge Porter, as referee, for the past four years, the proceedings are likely to assume a new feature in view of the promised revelations of Wm. M. Tweed. In the year 1870, Navarro supplied the city with 10,000 water meters at a cost of $70 each, and presented a claim against the city for $700,000. He found no difficulty in having his claim audited by the Ring, but before its payment Andrew H. Green succeeded Connolly as controller, and he directed an examination into the character of the claim. The result was a refusal on the part of Mr. Green to pay the bill on the ground of conspiracy between the claimant and the several members of the Tammany Ring. A subsequently alleged cause of the refusal of payment was the comparative worthlessness of the meters which have been since lying in the Twenty-fourth street pipe yard, near the East River. Proceedings against the Municipality were commenced in the spring of 1874. The claimant was represented by ex-Judge Emott and Messrs. Vanderpoel and Cuming. The city was represented by Messrs. Whitney and Bangs. Upward of 3000 pages of testimony have already been taken, but so far the charge of conspiracy has not been sustained. Tweed's appearance as a witness for the people places the whole matter in a new attitude. He is willing to expose the facts of the whole transaction. He was to have been examined yesterday, but owing to an accident to Corporation Attorney Whitney the reference was unavoidably postponed. On the 27th inst. he will be afforded an opportunity to tell all he knows on the subject.

In the manufacture of paper knives, keys for musical instruments, and other articles, large quantities of ivory dust are annually produced, and endeavors have been frequently made to utilize it by means of some agglutinative solution which would enable the mass to be molded into various forms, but hitherto attempts of this kind have not met with success. Much of the clean ivory dust is boiled to obtain the gelatine, which makes excellent jelly when suitably flavored and the refuse is sold to the manure makers. M. Latry, however, has described to the French Society for the Encouragement of Industry a method by which ivory dust and the dust of bones can, by means of an agglutinative substance, and under the influence of a high temperature and compression, be molded into various articles, suitably colored, and of extreme hardness.

TACKS, LINING AND SADDLE NAILS

UPHOLSTERERS, GIMP, CARPET, BRUSH TACKS, CIGAR BOX, FINISHING, TRUNK AND CLOUT, CHAIR NAILS, BRADS AND PATENT BRADS, SHOE NAILS, AND SHOE TACKS, BRASS, SILVER AND JAPANNED LINING NAILS, SADDLE NAILS, COFFIN TACKS, TUFTING BUTTONS AND NAILS OF ANY COLOR.

AMERICAN TACK CO. Factory at Fairhaven, Mass. N. Y. Salesroom, 117 Chambers Street.

COMMON, CHISEL POINTED, AND COPPER BOAT NAILS. ANY SIZE OR STYLE OF TACK OR NAIL MADE FROM SAMPLE TO ORDER.

CLARK BROTHERS & CO.,

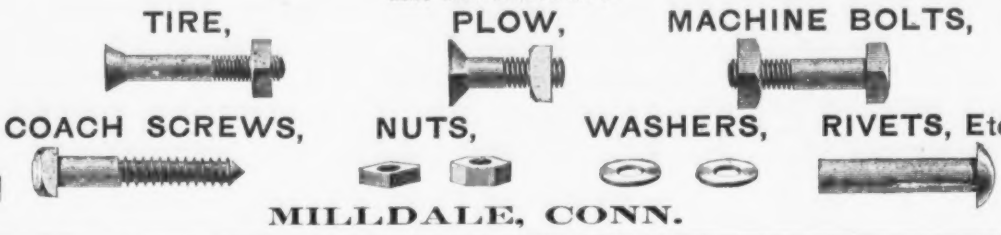
SOLE MANUFACTURERS OF

Clark's Patent Concave Carriage Bolt.

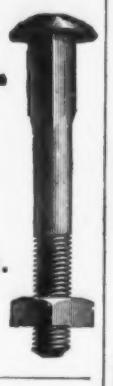
Best Bolt manufactured for all kinds of Agricultural Machinery. Will not split the wood, and cannot turn in its place.

ALSO MANUFACTURERS OF

TIRE, PLOW, MACHINE BOLTS,

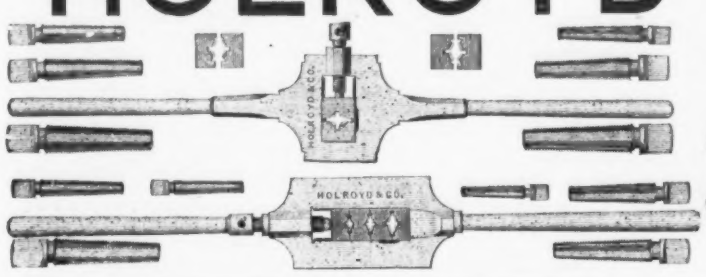


COACH SCREWS, NUTS, WASHERS, RIVETS, Etc.

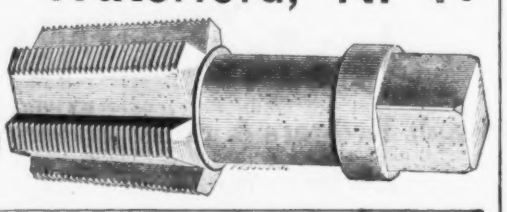


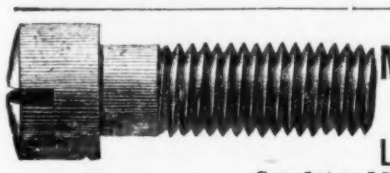
MILLDALE, CONN.

HOLROYD & CO.,



Waterford, N. Y.





TURNED MACHINE SCREWS,

One-sixteenth to five-eighths diameter. Heads and points to sample. IRON, STEEL and BRASS.

Lyon & Fellows Mfg. Co.,

Cor. 1st and North 3d Streets, Williamsburgh, N. Y.

C. R. MOON & CO.,

Dealers of

WROUGHT IRON HARDWARE SPECIALTIES FOR WAGONS

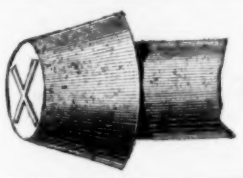
And all kinds of CARRIAGE AND WAGON MALLEABLES.

Also Manufacturers of

MOON'S IMPROVED NECK YOKE.

The Best and Cheapest in the market. Send for Catalogue. Correspondence solicited.

C. R. MOON & CO., 103 Scranton Ave. CLEVELAND, OHIO.



WM. GILMOR, of WM.

MANUFACTURER OF

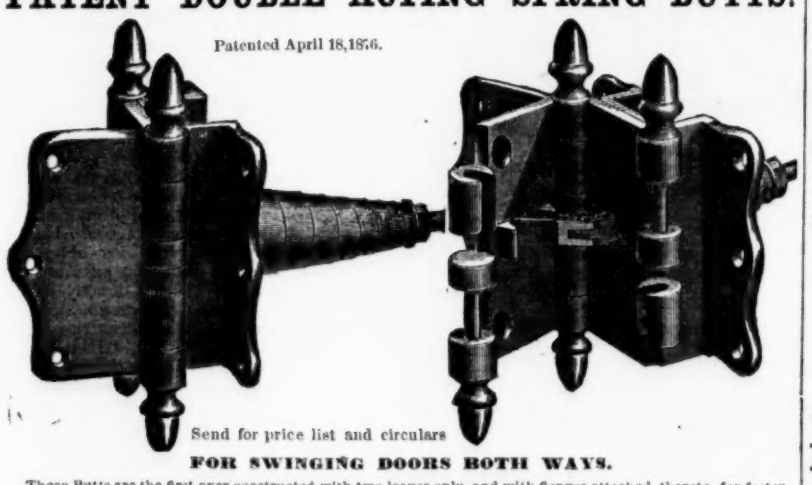
Boiler Rivets, Bolts, Railroad and Boat Spikes, &c.

BALTIMORE.

FRANKLIN S. MILES, Manufacturer of Brass, Iron, Steel and German Silver SCREWS. 205 Quarry Street, Philadelphia.

PATENT DOUBLE ACTING SPRING BUTTS.

Patented April 18, 1876.



Send for price list and circulars

FOR SWINGING DOORS BOTH WAYS.

These Butts are the first ever constructed with two leaves only, and with flanges attached thereto for fastening to the door and casing, thus rendering them much more substantial and easy to put on, as the screws are all driven from the outside. By means of the flanges the door is hung firmly to the casing. Instead of to a strip *as is the case with all other double acting Butts*, and the screws do not become loose, as the strain on them is much less. On the back of the Butt is a powerful volute spring, and draws in *direct line* with the center of the door, thus holding the door firmly in position, and *obviating all sag*. Our price list is from 25 to 40 per cent. lower than others. Manufactured by THE SABIN MFG. CO., Montpelier, Vt.

ERNST PASSE,

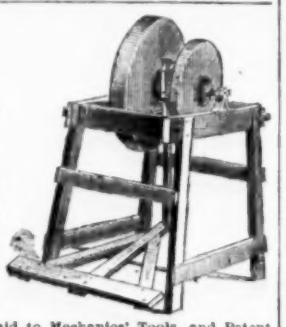
PRACTICAL MACHINIST.

Inventor and Manufacturer of the

UNIVERSAL JOINERS for Steam and Foot Power.

ALSO

Patent Grindstone Frame.



This is the greatest invention of its kind in the market. Can be worked from either right or left side. I sell to dealers the treadle and shafting only, or fancy frames with treadle and shafting complete (without stone).

I also call attention to my Patent Perfect

BENCH STOP.

This stop is stronger than any in the market, and is a perfect stop.

All kinds of Machine Patterns made to order. Special attention paid to Mechanics' Tools and Patent Office Models. Send for circulars. WORKS: COR. SECOND & CENTRAL AVENUES, CINCINNATI, O.

SAMUEL DILLER,

LANCASTER, PENN.

MANUFACTURER OF

COPPER KETTLES

Regular Sizes, 3 to 50 Gallons.

Price list sent on application.

R. COOK & SONS,

Manufacturers of

Carriage & Wagon AXLES,

WINSTED, CONN.

ESTABLISHED 1839.

H. PRENTISS & CO.,

Sole Manufacturers of

GODDARD'S PATENT-RELIEVED

Machinists' and Gas Fitters'

TAPS,

AND SOLID REAMERS,

AND DEALERS IN

Machinists' Supplies.

E. A. GODDARD,

Late N. Y. Tap & Die Co.,

General Sales Agent, *14 Dey Street, New York.*

Send for Price List.

Babcock's Sash Fastener,

PATENTED JAN. 11, 1876.

Needs but to be seen to be Appreciated.

Send for Circular. Sample, 50c.

C. P. BABCOCK, Portland, Me.

State Rights For Sale.

EUREKA SAFETY POWER!

Practically **impossible to explode.** Tested to 300 lbs pressure per square inch. Will slit 2 inch seasoned oak—grinds bushels Corn per hour. **Price $250.** Also, Stationary Engines and Boilers and **Spark Arresting Portable Engines** for plantation use. Send for our circular. Discount to the trade.

W. B. PAYNE & SONS,

Corning, N. Y.

COLEMAN

EAGLE BOLT WORKS.

(ESTABLISHED 1845.)

The Original and Only Establishment Manufacturing the

Genuine Coleman Eagle Bolt.

Made of Best Quality

SQUARE NORWAY IRON.

WELSH & LEA,

Successors to M. J. COLEMAN.

WORKS, Columbia Avenue, Hancock and Mascher Sts.,

OFFICE, 145 Columbia Avenue (Late 2030 Arch St.),

PHILADELPHIA.

Philadelphia "STAR" Bolt Works.

NORWAY IRON FANCY HEAD BOLTS,

Carriage & Tire Bolts. Star Axle Clips, &c.

TOWNSEND, WILSON & HUBBARD, 2301 Cherry St., Philadelphia, Pa.

FORT PLAIN SPRING AND AXLE WORKS.

FOR FALL TRADE.

All dealers in SPRINGS AND AXLES will find it to their interest to send to us for Price List and Discounts. WOOD, SMITH & CO., Fort Plain, N. Y.

A Fact. Jobbers & Dealers in

CARRIAGE AXLES

Buy Goods of the

Best WARRANTED material

FOR THE LEAST MONEY OF THE

CLEVELAND AXLE MFG. CO.

Send for Prices and Sample Lot. CLEVELAND, OHIO.

THE ÆTNA SPRING AND AXLE CO.,

John St., Bridgeport Conn., Manufacturers of

THE VERY BEST SPRINGS AND AXLES.

Our Standard Springs, weighing about half as much as the Springs of other makers, to do the same work cost but little more per vehicle than a common Spring. Our Jamb-screw, Collinge Collar, Parallel Arm, Malleable Iron Box Axles are the best in the world. Exclusive makers of

LEWIS'S TORSION AND CROSS SPRINGS.

Supercedes the Brewster Cross and End, dispenses with side spars, weigh less, hangbody equally low, ride easier and cost less. Shop newly stocked with new and improved Machinery. Send for Price Lists

W. H. WILSON, Prest. and Treas O. P. LEWIS (formerly of Spring Perch Co.), Secy. and Supt.

WROUGHT IRON CLEVISES.

No. 1, 1x¾, iron, average weight, 1 lb.

No. 2, 1¼x¾, iron, average weight, 1½ lbs.

No. 3, 1½x¾, iron, average weight, 2 lbs.

Meikle Plow and Iron Works.

THOS. MEIKLE & CO.

LOUISVILLE, KY.

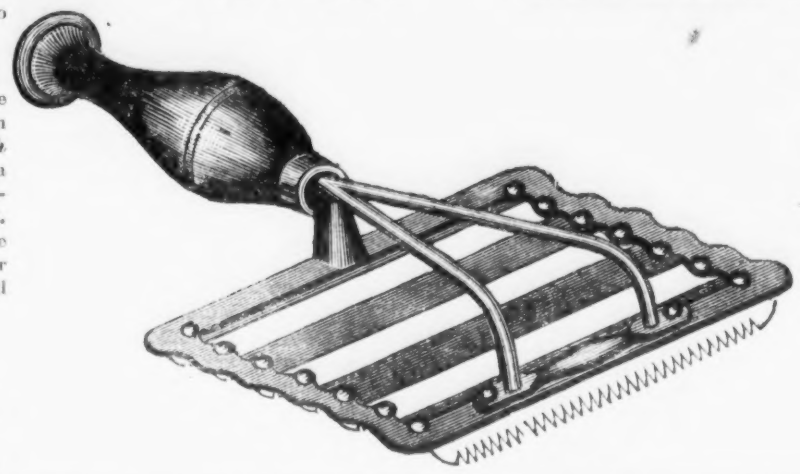
MADE OF ROUND EDGE CHARCOAL IRON ROLLED TO ORDER.

HOTCHKISS' PATENT "SUPERIOR" CURRY COMBS.

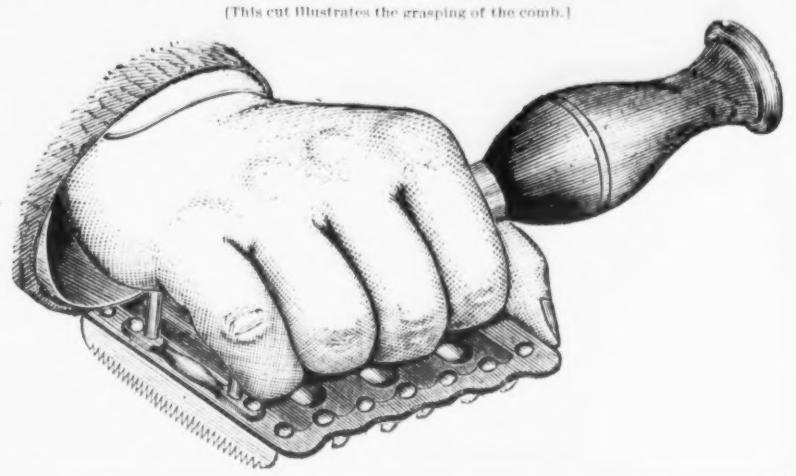
We invite the special attention of the trade to our

Patent "Superior" Curry Combs,

which are the *best* and *most complete* side handle combs having a grasp over the back now in existence, and which for *neatness, strength* and *durability* have *no* equal. Give them a trial, and you will be convinced they are *superior* to *any Curry Comb in the market.* They are neatly put up in paper boxes of one dozen each, and packed 15 dozen in a case. For sale by the Jobbing Hardware, Saddlery and Wooden Ware trade.



[This cut illustrates the grasping of the comb.]



HOTCHKISS' SONS,

Bridgeport, Conn.

SAMPLE AND WAREROOMS,
113 Chambers Street, Y. N.

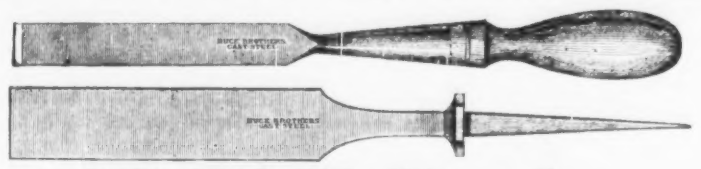
The only **GENUINE D. R. BARTON** Tools
ARE MADE BY

THE D. R. BARTON TOOL CO.,

Cor. Mill and Furnace Streets, ROCHESTER, N. Y.

AGENCIES:

HEATON & DENCKLA, - - **507 Commerce Street, Philadelphia, Pa.**
H. O. STRATTON, - - - - - **33 Oliver Street, Boston, Mass.**
HUNTINGTON, HOPKINS & CO., - - - - - **Sacramento.**
NATHAN WEED, - - - - - **4 Gold Street, New York.**



BUCK BROTHERS, Millbury, Mass.

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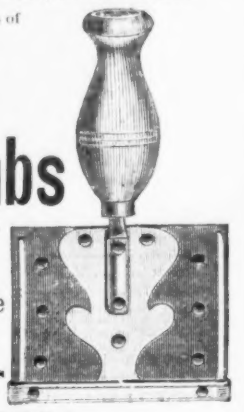

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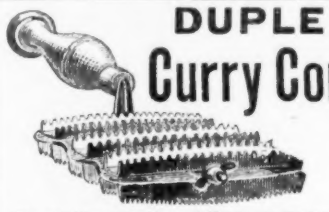

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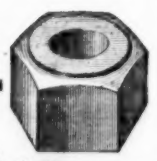

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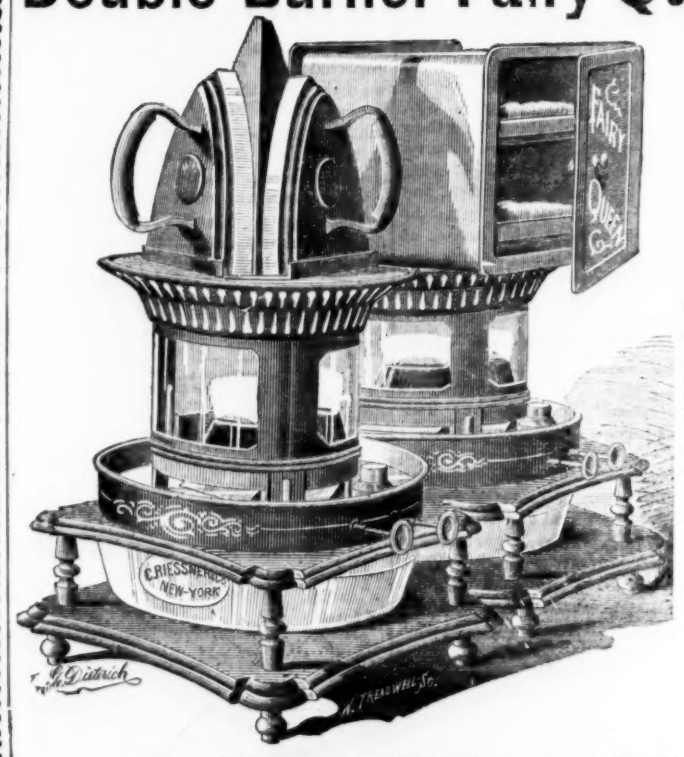

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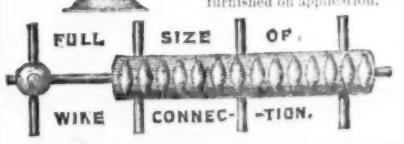

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City subscribers will confer a favor upon the Publisher by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall-ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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Furnace Construction in the Shawnee District.

The student endeavoring to master the details of blast furnace construction, can probably find no single locality of limited area where so much is to be seen and learned as in what is known as the "New Iron District" of Southern Ohio. Within a radius of about five miles from a central point he can study the construction or operation of eleven blast furnaces, from the first work of cleaning ground and brick-making, to the successful operation of a completed stack.

In size, there is considerable variety, the diameter of boshes ranging from 11 feet 8 inches to 16 feet, and the hight of stacks from 44 feet to 60 feet. All the stacks are iron jacketed, but the styles of jacket include the vertical, sloping, vertical and sloping combined, and curved, while the number of columns varies from 7 to 20. In the masonry of the stacks there also seems to be quite a variety of systems followed. Some are built entirely of special shapes of fire-brick, some entirely of 9-inch fire-brick, and some of the two combined. The same may be said of the thickness of walls. The inside shapes show fully as much diversity, extending from the straight lines and sharp angles to all curved lines, and including combinations of the two styles. There is less variety in boilers, and in the mode of setting them, but with sufficient difference in arrangement to prevent even this becoming monotonous.

Of hot-blasts there is as marked a difference as of styles of furnace. Combustion chambers are in general use, but vary considerably in size, style of pipe and mode of setting, according to the preferences of different builders. There are round pipes, and oval pipes, pipes with diaphragms and pipes without them. There are the low Whitwell stoves, and the moderately high stoves of the same make; the Ford stove with its large pipes, and the Weimer stove with its suspended pipes and independent chambers. Of stock houses, it may be said that they embrace everything from a mere shed, holding but a few hours' supply, to the commodious structure capable of containing stock for several months. Casting houses are here found of wood, of brick and wood, of brick and iron, and of iron. With one exception the blast engines are of the vertical type. The blowing cylinders are all either of 5 or 6 feet diameter, but the strokes are 3, 4, 5 and 6 feet, and represent the ideas of half a dozen manufacturers. There is one instance of double blowing cylinders on an engine. In the working speed, too, these engines are capable of making respectively 20 and 80 revolutions per minute.

In the details of tuyeres and other fixtures, there is also considerable scope for investigation. Some use water only for tuyeres and boilers, others add to this a water-tymp, while others have water-breasts, water-plates, etc. In fact, the variety extends through every part of the furnace plant.

The following is an epitome of the progress of work in the various plants:

At Shawnee, Fanny No. 1 and XX are running. Fanny No. 2 is about going into blast. Vilas Furnace is nearly lined; the hoist, cast house and engine house are finished; the engine is in process of construction; the hot-blast is almost completed and the foundations are ready for the boilers. The Akron Furnace, at Bessemer, is also well advanced, and two months will probably see both in blast. The last-named furnace was moved from Akron, Ohio; Fanny No. 1 was brought to Shawnee after a year's operation at Newark. The Ogden Furnace ranks next to Fanny No. 2 in progress, and but few weeks are needed to put her in condition to make pig iron. The Winona Furnace is well under way, the ironwork of the stack and hot-blast stoves being ready for the masons and all the foundations completed. She will probably blow in about December 15th. The Monday Creek Iron Company have but lately begun the preliminary work of furnace construction, but as the stack to be erected there is to be moved from Columbus, it will not take long to set it up. The Crafts Iron Company are moving the Kenton Furnace from Newport, Ky., and are somewhat more advanced than their neighbors, the Monday Creek Iron Company. The Sandusky Furnace, at Oreville, is being pushed forward to an early completion, and will probably go into blast soon after the Akron and Vilas furnaces. The furnace at Gore is out of blast at present, some improvements being made and a new hearth and bosh put in. The Baird Furnace is in successful operation.

Within the new district, but not within the five-mile radius above mentioned, is the plant of the Moxahala Iron Company, which is being energetically constructed. This makes in all 12 furnaces in various stages.

Not only in the construction, but also in the location, of the various works there can be found much to instruct, for an apparently wise location may be found to be more unfavorable than was expected by reason of cinder room, water supply or convenience of minerals, and similarly, an apparently unwise location may prove to be most advantageous. On the whole, we think that such of our iron masters and furnace engineers as are interested in studying good and bad practice in full detail, will find a trip to this district both pleasant and profitable.

A statement of considerable significance appears in our foreign exchanges for the first week in September, and is expressed in these words: "One reason why Belgian coal "is finding less demand in France, is the "fact that it has now to contend with Amer-"ican competition to some little extent. The "French General Transatlantic Company, "for instance, is now using American coal." It is hardly worth our while, at present, to throw up our hats and get too hoarse over this statement, but still it has some importance. The company referred to runs large steamers to the United States; they can, doubtless, get the supply of coal for their return voyage in this country on more advantageous terms than in Europe, and if they were to carry a surplus it would cost for freight less than others would have to pay. The importance of the fact is that so much more of our surplus coal production is being used, and that, of itself, is a cause for congratulation.

The American Share in Argentine Trade.

The fourteen provinces of the Argentine Republic under Spanish domination formed part of the vice-royalty of the Rio de la Plata. In 1817, during the war of independence, they were formed into a Republic; we acknowledged them as early as 1822, and in 1826 they assumed their present title. The Republic comprises an area of 750,000 square miles; the population in 1840 numbered 700,000, and in 1869 it had increased to 1,877,490—having almost trebled in thirty years. This rapid increase of population is in part due to the large European immigration which the country has attracted since 1856, especially from Italy, Spain and France. The number of immigrants during eighteen years, 1857 to 1875, amounted to 449,353 persons. No country south of the United States can boast of such a large and valuable immigration. The principal occupations of the inhabitants are stock-raising, agriculture, and the mining of gold, silver, copper and lead. In 1876 they had 3,960,332 horses, of the estimated worth of $17,000,000, and 132,125 mules worth $2,200,000; 13,493,000 head of cattle, worth $80,000,000; 57,546,448 sheep, worth $84,100,000, and producing annually 160,000,000 pounds of wool. Of goats there were 2,863,227, worth $2,700,000. This great stock interest, it is to be observed, was represented by a joint value of $186,000,000 gold, or $100 per capita of the population.

The Republic manufactures next to nothing, and it is therefore of the greatest importance that we should impart greater activity to our commercial relations with the Argentines, who draw the bulk of what they require of manufactured goods from Europe.

Between the Republic and Chili 1600 miles of railroad are now in operation. Buenos Ayres is a great shipbuilding port, with a total national tonnage of 140,528, there being 160 steamers under the Argentine flag, and 3225 sailing craft of all sizes. The following table shows the foreign trade of the Argentine Republic during 1875, in thousands of dollars, silver:

	Import.	Export.	Total.
Germany	2,179	1,228	3,407
Belgium	1,822	15,497	17,319
Spain	3,188	1,913	5,101
France	12,183	9,367	21,550
Holland	739	263	1,002
England	15,360	7,619	22,979
Italy	2,741	1,747	4,488
Portugal	128	52	180
Other European countries	230	252	482
	38,570	37,938	76,508
Asia (India)	308	4	312
West Indies	191	675	866
Bolivia	127	367	494
Brazil	3,022	771	3,773
Chili	1,689	3,531	5,220
Uruguay	3,179	1,017	4,196
United States	3,069	3,056	6,125
Paraguay	1,018	493	1,511
Peru	3	131	134
	12,278	10,041	22,319
Indirect American trade	4,610	2,350	6,960
	16,888	12,391	29,279

Recapitulation.

With Europe	76,508
" Asia	312
" American countries	29,279
Total	106,099

The foregoing shows that we furnished the Republic only 5½ per cent. of what they imported from foreign countries, and that we drew from them 5 per cent. of the total exports of the country. It therefore proves that, large as our trade with Buenos Ayres is, there is the same relative insignificance that marks our share in the Chilean, the general South American and Oriental trades.

The following figures show the tonnage in the trade movement of the Argentine Republic, according to flags, by thousands of tons:

ENTERED.

	1870.	1871.	1872.	1873.	1874.	1875
American	43	41	52	55	32	48
Other nations	752	733	1,061	896	769	859
	795	774	1,113	951	801	907

SAILED.

American	43	40	42	55	33	42
Other nations	682	713	996	883	766	817
	725	753	1,038	938	799	859

By these statistics we find that there were entered and cleared during the six years, together, 10,453,000 tons, 526,000, or five per cent., of which were American.

It will next be of interest to examine which flags participated in the departures of sailing vessels with cargo, in thousands of tons:

Flags.	1870.	1871.	1872.	1873.	1874.	1875.	Total.
English	64	80	107	45	56	29	381
Italian	53	52	72	72	38	39	326
French	33	37	56	36	24	17	203
Spanish	28	25	38	24	24	37	176
German	23	19	32	21	18	12	125
Norwegian	14	12	13	13	4	12	68
Dutch	16	11	11	13	4	8	63
Swedish	5	6	4	6	4	7	32
Austrian	3	1	5	7	1	....	17
Portuguese	....	2	5	1	1	2	11
Danish	3	2	2	1	2	1	11
Belgium	1	2	1	1	....	....	5
Russian	2	1	1	1	....	....	5
Greek	....	....	1	1	....	....	2
	245	250	348	242	176	164	1,425
American	34	31	33	22	21	30	171
Other flags	9	21	32	11	13	19	105
Total	288	302	413	275	210	213	1,701

From what precedes it will be seen that out of sailing vessels leaving Argentine ports during the six years in question, measuring 1,701,100 tons, we owned vessels representing 171,000 tons. The movements of steamships with cargo and in ballast, on the other hand, were as follows, in thousands of tons:

Flags.	1870.	1871.	1872.	1873.	1874.	1875.	Total.
English	122	101	227	197	240	221	1,168
French	36	39	65	80	93	108	421
Italian	10	80	28	23	20	23	190
German	....	2	13	21	32	51	119
Belgian	1	1	1	....	....	6	9
Norwegian	....	....	....	....	1	4	5
Spanish	....	2	....	....	....	2	4
Dutch	....	....	....	....	3	....	3
Danish	....	....	1	....	....	....	1
Portuguese	....	1	....	....	....	....	1
	175	286	335	321	389	415	1,921
American	....	1	4	3	4	....	12
Other flags	189	122	216	141	99	96	863
Total	364	409	555	465	492	511	2,796

Departures of sailing vessels with cargo and of steamships with cargo and in ballast:

	1870.	1871.	1872.	1873.	1874.	1875.	Total.
Sail	288	302	413	275	210	213	1,701
Steam	364	409	555	465	492	511	2,796
Total	652	711	968	740	702	724	4,497

The total tonnage under the heads we have given was thus 4,497,000. The foregoing also shows that the average annual departures were 749,000 tons, of which 466,000 tons, or 62 per cent. of the whole, were moved by steam; furthermore, that 60 per cent. of the vessels sailing under European flags were steamships. Taking sailing and steam vessels together, and grouping the principal European tonnage by nations, and in the order of their importance, it will be seen that, as usual, England heads the list:

England—Sail	381,000	
" Steam	1,168,000	
		1,549,000
France—Sail	421,000	
" Steam	203,000	
		624,000
Italy—Sail	326,000	
" Steam	190,000	
		516,000
Germany—Sail	125,000	
" Steam	119,000	
		244,000
Spain—Sail	176,000	
" Steam	4,000	
		180,000
Total		3,113,000

Five nations thus monopolized 70 per cent. of the entire movement, and our share in the Argentine traffic was almost altogether confined to sailing vessels, in which we had but 10 per cent. The statistics we have given prove that the substitution of steamers for sailing vessels is proceeding most rapidly in the Argentine trade, and that the English, French and Germans are competing sharply in this direction. If we further examine the statistics of exports and imports, we shall find that for the six years ending with 1875 the Argentine Republic received only six per cent. of its imports from this country, and that European nations furnished them altogether almost twelve times as much as we did. In exports, Belgium heads the list, and next come England and France. Our own share in the export trade movement during the six years has been only 9 per cent. The general Argentine trade movement, import and export, during the six years stood as follows:

Import	$334,300,000
Export	240,500,000
Aggregate trade	$574,800,000

Of this total the seven leading commercial nations of Europe did $391,200,000, or about 70 per cent., while our own share in this general movement was but 7½ per cent.

In other words, the Europeans did almost ten times as much business in that quarter as we did. The American export of domestic products to the Argentine Republic during the fiscal year ended June 30, 1876, was made up of the following goods:

Agricultural implements	$53,757
Flour	23,746
Clocks and parts thereof	20,818
Cotton goods	37,493
Drugs	61,750
Hardware	158,478
Rosin and crude turpentine	14,053
Refined petroleum	144,197
Lard	43,759
Fish	7,105
Sewing machines	14,771
Spirits of turpentine	7,670
Refined sugar	363,782
Tobacco	118,427
Lumber	88,115
Furniture	78,513
Woodenware	57,836
Other goods	224,920
	$1,519,190
Foreign goods	65,862
Entire export	$1,585,052

Our import, on the other hand, amounted to $3,602,736, and consisted principally of hides, hide cuttings, bones, bone ashes, goat, nutria and deer skins, wool, horse hair, horns and ostrich feathers.

The articles of domestic production which the Argentines will take from us in increased quantities in the future, if we will but devote a little more attention to this important trade, are the following: Agricultural implements, clocks, cotton fabrics, hardware and tools, machinery—such as tallow, wool and hide cutting presses—petroleum, lard, sewing machines, refined sugar, tobacco and furniture, as well as stoves and all kinds of house-furnishing goods.

With lumber the Republic has been overstocked of late years; usually we send them large amounts both from the North and from South Carolina and Florida. These people hardly manufacture anything, their natural resources being such that it pays them better to develop them to the utmost, and get everything from abroad that requires to be manufactured. Now that we are able to furnish them hardware, machinery and cotton goods as cheap and of better quality than any European nation can, we ought to push trade in that direction energetically. It will soon grow up to proportions encouraging our steamship owners and merchants to establish again a regular steamship line between New York and Buenos Ayres, touching at St. Thomas, the Brazilian ports and Montevideo. Our large import of hides from Buenos Ayres, Montevideo and Rio Grande do Sul already, to a degree, offers a solid basis for an extension of steamship communication to the extreme portion of eastern South America. Various lines have been established in former years, but they failed for want of goods securing a prompt dispatch when on the berth for those latitudes.

After some political troubles and financial disasters the Argentine Republic is, according to the latest accounts, emerging from its temporary prostration in a most striking manner, and the field is, therefore, all the safer and more inviting. We trust that our merchants and manufacturers may improve the opportunity thus presented.

Why Trades Unionism is a Failure.

One of the strongest, as well as the wisest and most ably managed of the combinations of workingmen in this country, was the Brotherhood of Locomotive Engineers. While one of its objects was to consider the question of wages from time to time as occasion might arise, and to endeavor to secure an advance or prevent a decline, their means for accomplishing these ends were not the common ones of strikes but the rare one of argument. They met the officers of the roads and talked over the situation in a fair, candid, intelligent way, and as a result a strike legalized by the Brotherhood was unknown for years.

Of the benefit of such a union, not only to the engineers but to the railroad companies as well, there can be no question. There are always, in the matter of wages, two parties in interest, and both are entitled to consideration. The railroad officials, while their only object might be to be impartial, could hardly fail to be somewhat prejudiced and, if they could have the views of their employes fairly and honestly presented, without any demagogy or any attempt to overreach, it would give them an important factor in arriving at a fair decision.

But an evil day came, and on a question of punctilio the strike on the New Jersey road was authorized. Trains were left standing at midnight wherever they might be, the good feeling between employer and employe was at once broken up, and all for a question of the dignity and honor of his high mightiness, the Chief Engineer. It is no secret that the best men in the Brotherhood were opposed to this strike, and with good reason, as it is now considered to be the beginning of the downfall of the union.

The next steps were the strike on the Boston and Maine Railroad, the appearance of the chief before the Legislature, and, as is well known, the defeat of the Brotherhood. From that time to this they have to record a continued series of defeats, failures and defections. The division of the Brotherhood in Springfield, Mass., has formally surrendered its charter, assigning as a reason the failure of Chief Arthur to fully redeem his promise made to the striking engineers of the Boston and Maine Railroad. All through New England and the eastern part of Pennsylvania there is the same feeling of discontent. At Pittsburgh the regalia of one division is to be sold at constable's sale. In the former section the course of the chief and the appearance he made before the Legislature rendered it too evident that he was a demagogue and nothing else, and the engineers of the country are too intelligent and too sensible a class of men to give respect and allegiance to such a man.

If we acknowledge that the failure of the Brotherhood is only partial, the course of its failure shows the weak points of trades unionism at its best, and what must be avoided if combinations of workingmen are ever to succeed permanently. Thoughtful and liberal employers concede the necessity of organizations among their employes. They know that capital is often aggressive and grasping, and that labor, unless it is organized and compact, will be at its mercy. The views of the Hon. Thurlow Weed on this subject, which have been so widely published the past week, are worthy of the most careful consideration. It has not been against combinations, as such, that employers have fought, but against the abuse of them, against the spirit of demagogism that its leaders have manifested and the lack of wisdom and foresight on the part of its members.

Some have believed, and still do, that these abuses are inseparable from trade unions, especially in those branches of labor in which laborers have little education. Even honest men among the leaders of these unions recognize this fact. "The trouble with "our men is they don't think," said the president of one of the strongest unions recently. They would rather not know the truth if it militates against them. They do not care to listen to the logic of their actions as their shrewdest men see it, and they have again and again expelled their best men who have dared tell them where their course was tending and begged them to consider. And so as the leaders do not prefer being right to being president, they coddle and cherish these spirits. There are enough sensible and clear headed men in most of these unions, if they

would attend the meetings, to lead them to act sensibly, but since they will not attend, others rule and unionism has no respect from capital.

Who are Workingmen?

Just what definition of a "workingman" is accepted by those who labor with their hands is a matter of no little interest and curiosity by those who have read the journals devoted to what is popularly known as the labor interest, and who listen to the speeches of the labor reformers. We had imbibed the idea from those sources that a workingman was one who worked with his hands, either with skill or without, and that one who did brain-work only was not a workingman. To repeat the oft-repeated nonsense of the labor reformers, "A workingman is a producer."

But a change has come over the spirit of the dreams of these labor reformers. Tossing uneasily in the watches of the night, they have dreams of political power which may or may not be realized, and they see that their definition of a workingman must be changed. Some of the offices to be filled require brains and brain-work, and a previous education. There are votes wanted also, and so the definition must be enlarged. A late issue of a prominent labor journal thus defines a workingman:

> They are workingmen who labor with body or brain, or both; who are receiving compensation directly from individuals and corporations, or from society for their services, in amounts somewhat appropriate to the amount and character of the labor performed. It is not necessary to enumerate—nor would it be possible to do so without the inconvenience of compiling a long list of the various trades, professions, etc., that come under the definition—but for information we will state that a writing editor is a workingman, in the true acceptation of the term, if he is an employe who labors many hours into the night to earn his weekly salary, or a proprietor, who from necessity performs work for himself equal to that he would require from an employe."

If this is not broad enough to take in everybody, we fail to understand its true meaning. This definition would include even Col. Scott, or Mr. Gowen. Do not these gentlemen "receive compensation directly from a cor-"poration"? Does not every capitalist from "necessity perform work for himself equal "to that he would require from an employe," and in some cases a hundred times greater?

We imagine that the saving clause in the above extract is the one in which it speaks of "compensation * * * for their services "somewhat appropriate to the amount and "character of the labor performed." A man is a workingman when his compensation is appropriate, and something else when it is not. If $5 per ton is an appropriate price for puddling iron, a man that gets $6 is not a workingman. If 3 cents a bushel is an appropriate price for digging coal and a miner gets 3½ cents, he is not a workingman.

Seriously, we are pleased to note, no matter what the occasion may be, that those who have claimed that they alone are entitled to the distinction of being called workingmen—for it is a distinction—are willing to grant that those who are toiling with their brains are justly entitled to rank with them as legitimate sons of toil; that whether restful sleep follows as the result of the day's use of the pick or shovel, or rabble or hammer, or from the use of thought and memory and imagination or reason, it comes to a workingman and not to an idler. The recognition of this fact indicates a progress toward a fuller conception of one of the elementary truths of political economy, which is too often lost sight of by those who represent the labor unions. In point of fact capitalists, as a class, are the hardest worked of workingmen, and their compensation often bears a much less close relation to the amount and kind of work they do, the qualifications they possess and the years of preparation required, than do the lowest paid mechanics or other toilers for bread. The only reason that puddlers do not earn capitalists' wages is, generally speaking, because they have neither the qualities nor the qualifications. Those who have become employers find that with every upward step on the social ladder their work increases and becomes more difficult.

The Trade of the Western Waters.

Secretary Sherman, in his Mansfield, Ohio, speech, made a wonderful mistake regarding the tonnage of the Mississippi River and the water carriage of the country. He estimated the tonnage of the Mississippi River at 3,000,000; the Northern lakes, 3,000,000; and the New York canals, 4,172,170 tons; total, 10,172,170 tons, against which the four trunk railroad lines carry 27,649,502 tons.

This is a most ridiculous estimate, and shows that some one has blundered. By the Mississippi River is meant the whole system, including the Ohio, Missouri, Red River, etc., and their branches. And it is a sufficient answer to this to state that the coal tonnage of the Monongahela River alone exceeds the entire amount credited to the Mississippi River. Some 90,000,000 bushels of coal are floated annually down this river to Pittsburgh. The bushel is 76 pounds, which would give a total of 6,840,000,000 pounds or 3,420,000 net tons. This one item alone is in excess of the amount credited to the Mississippi. Add to this the immense amount of stone, wood, lumber, ore, pig iron, cotton, coal from other points, shipped in barges, together with the tons of miscellaneous freight shipped by steamboats up and down this river and its branches, and the amount that annually passes over the 100 miles from New Orleans to the mouth of the river, and it is safe to say that the tonnage of this river exceeds the whole amount credited to water lines. It is doubtless true that the tonnage of Chicago alone, in lumber, stone and coal, exceeds the estimate for the Northern lakes, and to this must be added the grain trade, the millions of tons of ore that annually come from the Lake Superior regions, and all the general freights.

Congress and the Paris Exposition.

We see it stated in the special dispatches from Washington that Secretary Evarts will submit to Congress, at its special session, the correspondence relating to the Paris Exposition, and call attention to the necessity of Congressional action on the subject at once, so that our Government may be represented. The necessity of such action is apparent. No exhibitor can be admitted to the Exposition except through the commissioner of his own country; commissioners cannot be appointed from this country until the invitation of France shall have been accepted, and this should be preceded by an appropriation. If Congress will make such an appropriation during the first six weeks of its session, there will be time to secure a good representation—at least from those manufacturers who wish a foreign trade, and it will be in this direction that the Exposition will be of benefit to the iron trade. We have begun to look for and secure foreign markets for our goods. Many of our manufacturers of iron and hardware need only to be seen and compared with the products of other countries to have their superiority demonstrated at once. Our agricultural implements and those used in forestry are examples, as well as our locks, nails and other building hardware. Our railway equipments and supplies are also taking a leading position, and seeking and obtaining a recognition abroad. It is to give them a still wider demand that those interested should urge upon Congress the appropriation of a sum sufficient to enable our country to be represented. It would also be well for those who desire to send exhibits to have them in preparation so that no time may be lost, as it seems probable that Congress will grant the sum asked.

Scientific and Technical Notes.

Scarcely any subject of research is more important than that of

PROTECTING IRON FROM CORROSION,

by means of a durable surface covering of some sort. The proposal to form upon the surface of the iron a coating of the black oxide seemed to be one of the most promising methods of accomplishing the desired result. Prof. Barff, M. A., of Cambridge, England, at the last meeting of the British Association, read a paper upon the formation of the black oxide of iron upon iron surfaces for the purpose of preventing corrosion. The author pointed out the cause of his many failures in his first experiments, and the failures which others had experienced in obtaining a perfectly adherent and coherent coating of black oxide, as arising from moisture in the steam with which the articles operated on were oxidized. When perfectly dry steam is used and no air admitted into the muffle, or oxidizing chamber, then in all cases a perfect protecting film is formed. The process is exceedingly simple: a wrought iron muffle containing the iron articles to be operated upon is heated to a dull red heat, all the openings closed, and dry steam turned in, and the muffle kept filled with the steam during the whole operation, which lasts from three to five hours; the fire is then raked out, and the articles allowed to become black in an atmosphere of steam; after this the steam is turned off and the muffle and its contents are allowed to cool slowly. The temperature to which the muffle is heated varies according to the nature of the articles operated on—from 350 deg. to 700 deg. C., or from 662 deg. to 1292 deg. Fahrenheit. More recent experiments seem to show that the process may be further simplified by using superheated steam of such a temperature that the external application of heat to the muffle is unnecessary. A considerable number of cast iron, wrought iron, and steel bodies which had been coated were exhibited. Many of these had been out of doors for months; others had been kept in fresh water or in seawater for a similar length of time, but not the slightest indication of further oxidation was visible. Even strong nitric and sulphuric acids are without action on this coating of black oxide. Prof. Barff is not the only gentleman engaged in the solution of this problem of protecting iron surfaces. Mr. M. P. Hess, for the purpose of protection, gives a bronze coating to iron by painting the articles with linseed oil and heating them exposed to the atmosphere. But if the goods are of such a nature that they may be injured by a high heat, he immerses them in a slightly acid solution of ferric chloride, plunges them in hot water, and when they are dry, coats them with wax or linseed oil. To keep iron from rusting he submits the articles for a short time to the action of a solution of the sulphate of copper, and then introduces them into a solution of the sulphate of soda acidulated with hydrochloric acid. A blue-black surface is thus imparted which neither air nor water can affect.

Mr. William Froude, F. R. S., recently prepared a paper in which some

INTERESTING FACTS ON THE RESISTANCE TO SHIPS' MOTION

were presented. The object of the paper was to show the effect produced on the resistance to a ship's motion by the lengthening or shortening of the flat middle body between the bow and stern. The results were based upon experiments made at Chelston Cross with models having the same ends, but lengths of parallel body inserted amidships. By separating the effect of the frictional skin resistance, which was proportional to the wetted surface, he proved that the increase or diminution of the power required to propel a ship, in consequence of the alteration of the length of the parallel body, depended very largely on the coincidence, or want of coincidence, of the wave crests traveling alongside the ship with the points at which the reduction of breadth by the fine lines began. When this diminution coincided with a wave crest there was no loss, but rather a gain of speed; while when it coincided with a wave hollow the loss of speed, or increase of resistance, was considerable. In a sort of blind way builders of our American river steamers have been conscious of some such law as this, and in practice it has often been demonstrated. Many instances are on record where the addition of 20 or 30 feet of "straight" body to a river steamer has wonderfully improved her speed, but we believe there are an equal number of cases where no benefit was derived, and one or two where the speed was rather diminished by an increased length. In one instance, if we are not mistaken, a second increase reduced the speed slightly. The reason for the gain or loss now seems evident. When the "run" was by the addition of the straight body made coincident with the crest of the cross wave traveling alongside near the stern, a gain in speed was the result, but when by the first or by a second addition the trough or hollow of the wave was brought along the run there was a loss of speed. We have recently examined several steamers in the harbor with a view to ascertaining whether any gain could be made by an increase of length. We found two which would probably be greatly improved by the addition of 15 or 20 feet, and several others to which an addition would prove of no advantage whatever, as the run and following waves already had the best possible relation.

For some months past the preparations upon the tower of the Western Union building in New York have led people to hope that the city was to have

STANDARD TIME BY MEANS OF A TIME BALL

dropped at noon. A time ball to guide shipmasters in regulating their chronometers is not exactly a novelty in the port of New York, it would seem, for there is a tradition that some 15 years ago it was customary to hoist one by hand from the custom house, and that it was made to answer all the purposes of shipmasters and others in those days of comparative inaccuracy in scientific matters. Since that signal was abandoned there has been no official announcement of time in this port, except the evening gun from the navy yard, and this has never been considered sufficiently loud to be of much use to the shipping interest. In foreign countries time balls and signal guns in seaports have been in use for many years. In Great Britain they are established at the principal ports, and at Bergen, St. Petersburgh, Kiel, Lisbon, Cadiz, Cape of Good Hope, Algoa Bay and many Asian ports. There are signal guns and time balls even in Australia and Canada, but for years the only time ball in the United States regulated by telegraph was that at Washington. In April last an arrangement was concluded between the Superintendent of the United States Naval Observatory and the Western Union Telegraph Company for disseminating the standard time from the Naval Observatory to ship owners and masters, business men, railways, chronometer makers, and the public. To carry out this arrangement a ball was constructed to be raised upon the flagstaff of the Western Union Building, but one weighing 100 pounds was found to be too heavy, and it had to be reconstructed. Time was thus consumed, and the apparatus was not ready until within a few days. A ball 3½ feet in diameter, made of copper wire and gilded, is at 11.55 a. m. hoisted 30 feet from the top of the cupola by means of a light cable wound round a cylinder in the clock compartment of the tower. The cable is held by a bar attached to a magnet, and this magnet was connected with a wire ready to be joined to the Washington circuit. In the great operating room of the company, at 11.55, the beats from the standard motor in the Admiralty Office at Washington begin to be told off, the sixtieth beat being omitted, in order to indicate the termination of the minute. At about 40 seconds before 12 o'clock, New York time, the wire connecting the Naval Observatory clock is connected with the instrument in the cupola of the building, and when the siderial clock at Washington tells 11 hours, 47 minutes, 49 seconds the bar holding the reel which secured the ball in position is released, and the gilt ball comes down by the run. It can be seen by shipmasters all over the harbor, but when the ball has been painted black it will be much more distinctly seen than now. It is dropped from a point 30 feet above the cupola, and 250 feet from the sidewalk. There is no other time ball in the world displayed from so great a height. It is just possible that at times something may interfere with the transmission of the signal at noon exactly, in which case a red flag will be run up at 12.1 and kept flying until 12.10 p. m. The time of the falling of the ball is recorded automatically, and if by any cause it does not fall precisely at noon its error will be known, and it is proposed to notify the newspapers whether the ball fell at the correct time, or whether fast or slow. In a few weeks the Western Union Company expect to fill the staring blank spaces which appear in its cupola by four clock faces, and to furnish the standard time. The clock is now in the hands of the manufacturers and is nearly ready for delivery. Its works will be on the same floor with the apparatus by which the time-ball is hoisted and dropped. The Western Union Company are making preparations to communicate the standard time by telegraph to all who desire it in the principal cities of the country. The work just begun is without cost to the government, and the telegraph company has agreed to keep its lines open daily for the transmission of the signal. The notice to be published by the press will be as follows:

"*Western Union Time-Ball.*

"[Date.]

"The time-ball on the Broadway tower of the Western Union Telegraph Company's building, which is dropped at New York, noon (12h. 0m. 0s.), by the standard time of the United States Naval Observatory at Washington, was to-day dropped correctly (or — seconds fast, or — seconds slow).

"New York east of Washington, 0h. 12m. 10.47s.

"New York west of Greenwich, 4h. 56m. 1.65s."

The invention of the telescope has generally been attributed to Galileo, but it would seem that the honor can hardly be given to any one individual. Some curious person has claimed the honor of

THE INVENTION OF THE TELESCOPE

for another, on the authority of a manuscript in a library in Zurich, written in 1616 by Scheiner, in which occurs the following curious passage: "It must be allowed, first, considering what the telescope does, that Baptista Porta has better right to be thought the inventor, because he describes, after his own way, in obscure words and puzzling expressions, an instrument like the telescope. But, secondly, if we speak of the telescope, as it is now used after general perfection, we must say that neither Porta nor Galileo is the first discoverer of it, but the telescope in this sense was discovered in Germany, among the Belgians, and that accidentally by one Kramer, who sold spectacles, and either for amusement or experimentation, combined concave and convex glasses, so that with both glasses he could see a quite small and distant object large and near; at which success being rejoiced, he united several similar pairs of glasses in a tube and offered the combination at a high price to wealthy people. Thereafter they (the telescopes) became gradually more common among the people and spread to other countries. In this way two of them were brought for the first time by a Belgian merchant to Italy; of these, one remained long in the college at Rome; the other went first to Venice, later to Naples, and here the Italians, and especially Galileo, at that time Professor of Mathematics in Padua, took the opportunity of improving it to astronomical purposes, and extend its use further. Thus the telescope, as we have it to-day, was discovered by Germany and perfected by Italy; the whole world now rejoices in it."

Faraday's researches upon the nature of thin films of gold and other metals, and upon the

SIZE OF FINELY DIVIDED PARTICLES OF GOLD

diffused through various liquids, are of a most interesting and refined character. Availing himself of the well-known reducing power of phosphorus, he floated small particles of it upon the surface of weak solutions of chloride of gold. In the course of twenty-four hours he found that the surfaces of the liquids were covered with films of metallic gold, which were thicker near the pieces of phosphorus "possessing the full golden reflective power of the metal," but becoming so thin by gradations, as to be scarcely perceptible. "They acted as thin plates upon light, producing the concentric rings of colors round the phosphorus at their first formation, though their thickness then could scarcely be the 1-100, perhaps not the 1-500 of a wave-undulation of light."

By treating very dilute solutions of gold with phosphorus he obtained the metal diffused through the liquid in extremely fine particles, producing a beautiful ruby color. These particles, when in their finest state, often remain unchanged for months, and have all the appearance of solutions, but they never are such, containing in fact no dissolved but only diffused gold. The particles are easily rendered evident by gathering the rays of the sun (or a lamp) into a cone by a lens and sending the part of the cone near the focus into the fluid; the cone becomes visible, and though the illuminated particles cannot be distinguished, because of their minuteness, yet the light they reflect is golden in character and seen to be abundant in proportion to the quantity of gold present. Portions of gold so diluted as to show no trace of gold by color or appearance, can have the presence of the diffused solid particles rendered evident by the sun in this way.

In the latest reports of MM. Polier and Lapparent upon

THE SOUNDINGS FOR THE CHANNEL TUNNEL,

in which they give the result of the numerous soundings which they have taken during the last 18 months for the purpose of ascertaining the thickness and impermeability of the different strata in the channel, they state that "observation shows that the soil under the sea preserves the same characteristic as upon the French mainland—that is to say, a line traced upon the surface of one of the beds of chalk consists of long straight lines connected with one another with very pronounced sinuosities. Observation has also shown—and this is a capital point with regard to the making of the tunnel—that in these sinuosities, of which there are two in the channel, the strata are evidently continuous, and that the distance between the two successive lines is filled up, not by a fissure, but simply by a curve. There is, therefore, no reason for anticipating that the work will encounter any geological difficulties, properly so called, if we bear in mind the information furnished by a study of the sea's bed and by the work done in the mines which run down into the chalk. The boring at Sangatte has not been carried far enough to admit of any definite opinion being given as to the jurassical development of the soil in that region, but it has confirmed the deductions drawn as to the progressive diminution in thickness of the strata below the chalk which runs from Boulogne toward Calais. These strata are formed of sand and clay, with an admixture of palæozoic pebbles, red calcareous and carboniferous marl, but without any rock of the coal order.

Remarkable Pig Iron.

The Chattanooga *Dispatch* of the 22d inst. says: "We were yesterday shown some of the most remarkable pig iron that we think we have ever seen. It was a consignment received by Mr. S. B. Lowe, dealer in pig iron, of this city, from East Tennessee. It is what is known as cold-blast charcoal, and is intended especially for the manufacture of car wheels. Some of it was being broken up for testing, and the pigs stood from fifty to one hundred blows of a twenty-five pound sledge before breaking, and then only after the pig had been beaten from a straight line at least two inches. Some of the trial pieces that had been cast on a chill, were chilled to the depth of two inches. It is a new grade of iron in this market, and will, no doubt, meet with a ready sale."

IN PRESS.

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The favor with which *The Metallurgical Review* has been received, shows that it has entered upon a life of great and permanent usefulness, and the arrangements already made by its conductors give promise that its monthly issues will be found to possess a steadily increasing interest and value.

It is evident to all who are well informed as to the state of the metallurgical industries of the world, that we have fairly entered upon an era of exceptionally rapid scientific progress, in which many of the old methods of treatment will be superseded by new and more economical processes. The "New Metallurgy" demands a current literature of its own. Newspapers cannot give space to the calm discussion of matters of purely scientific interest; books can, at most, follow progress at a distance. *The Metallurgical Review* is intended to be a record of current progress, which shall combine the enterprise of a newspaper with the convenience and permanent value of a book. Its interest is both scientific and practical, and its conductors will spare no pains to secure valuable original contributions from writers of known ability and recognized scientific standing, American and foreign.

The field of *The Metallurgical Review* include whatever is new and important, or which possesse historical or practical interest relating to the metallurgy of the useful metals, from the mining of the ores to the final processes which make the metals available as materials in the arts. Matters of scientific interest indirectly connected with these subjects will also be considered, when of importance to the student or the original investigator.

The indexing of the volumes will be very complete. Each will have a general index of titles and a full topical index to aid the student in searching for facts and references. It is intended that a set of volumes shall be a valuable library of metallurgical literature, and nothing will be omitted which can in any way contribute to the convenience of the reader.

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CARRIAGE MAKERS' FORGED IRONS.

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RECEIVED THE HIGHEST COMMENDATION.

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TRADE MARK.

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TRADE MARK.

REPORT OF THE CENTENNIAL COMMISSION:

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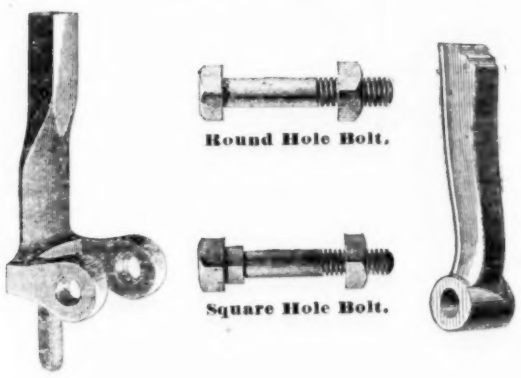
Smith's Interchangeable Shaft Couplings.

Smith's Pattern.



Round Hole Bolt.

Square Hole Bolt.

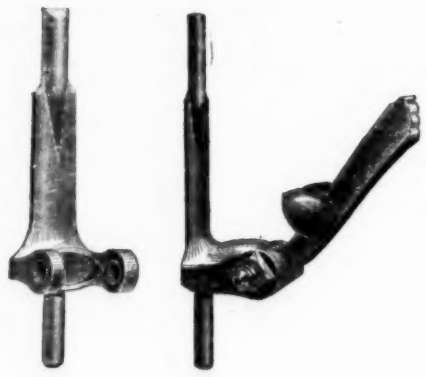
Patent Noiseless.

Rubber, with Improved Steel Lining.

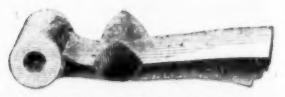
Patented April 7th, 1874.

Straight Ear.

Central Park.



Patent 1871 Shaft Eye.

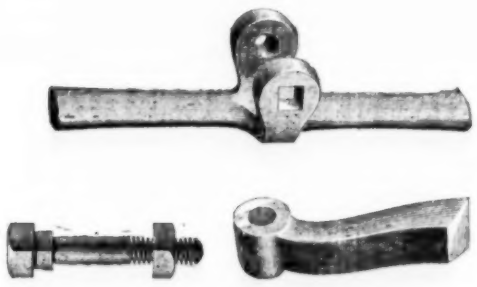


Patent Shaft Eye.

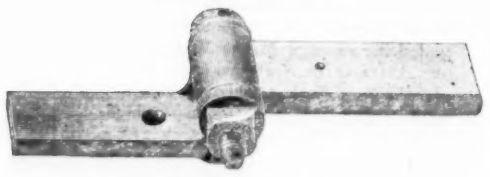
Shaft Eye, Finished with Wood.

Sleigh, Portland Pattern.

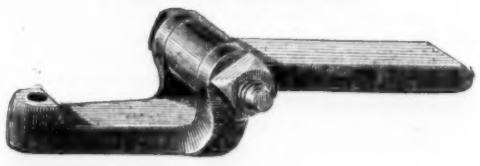
Sleigh, Albany Pattern.



Plain Pattern.



Clip Bar Pattern.



Smith's Milled Stump Joints.

Forged Slat Irons, Socket Pattern.

See other Illustrations on page opposite.

H. D. SMITH & CO.,

MANUFACTURERS,

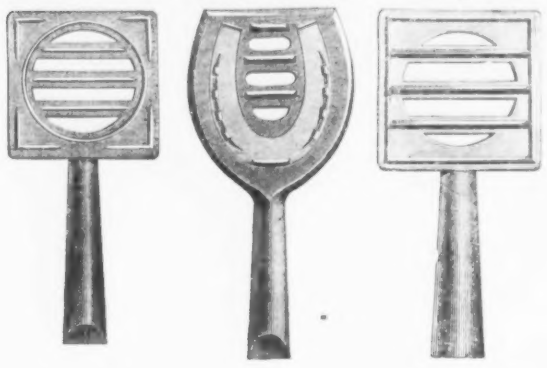
Plantsville, Conn.

GRIDIRON,

Cabriolet.

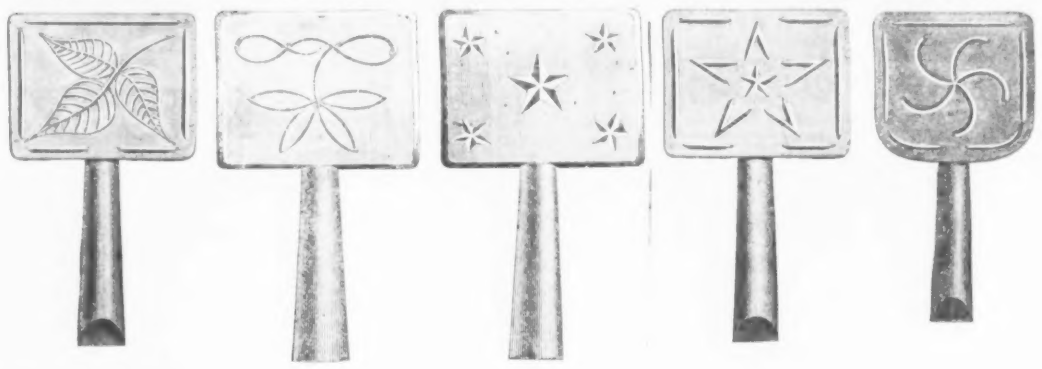
PATENT CROSS BAR,

77. Horse Shoe. 71.



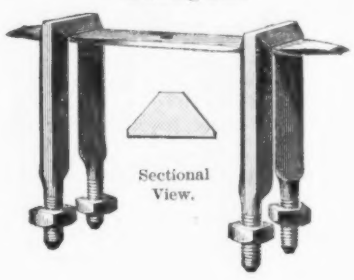
PATENT EMBOSSED, STEP PADS.

Three Leaf. Four Leaf. Five Star. Double Star. Scroll.

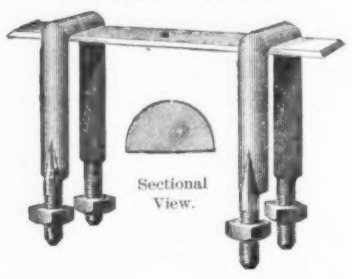


SADDLE CLIPS.

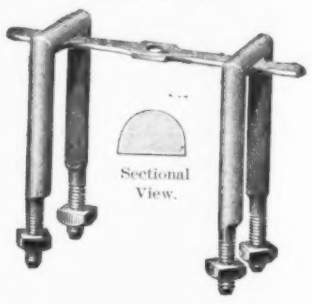
Octagon.



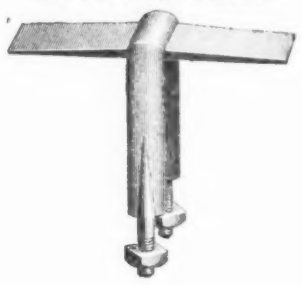
Solid Double.



Skeleton.



Brewster Patent.

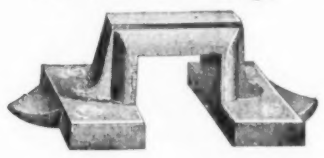


Axle Saddle.

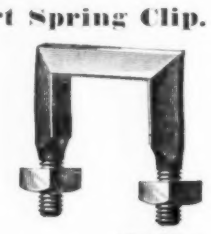
American Coach Clip.

French Coach Clip.

Coach Axle Clip.

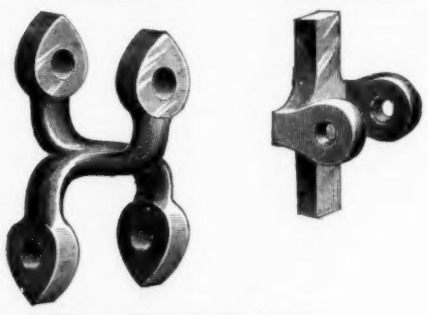


Short Spring Clip.

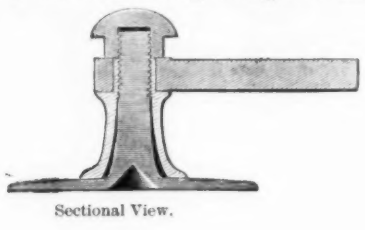


SPRING COUPLINGS.

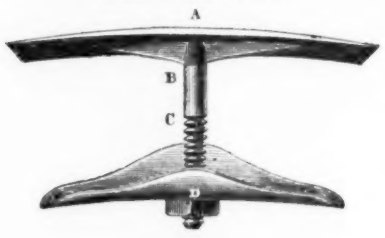
Platform. Side Bar.



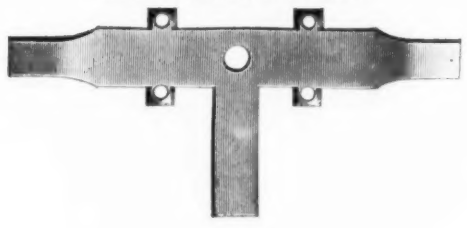
Thomas Prop Improved.



Felloe Holder.

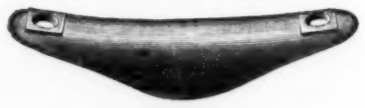


Head Block Plate.



Felloe Bolt.

New York Pattern.



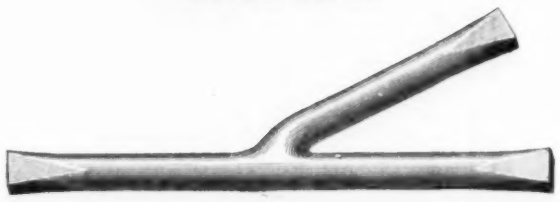
Smooth Finish Yoke.

Lip Body Loop.

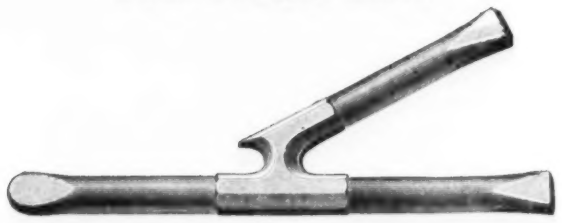
AXLE AND SPRING BAR CLIPS.

Plain Pattern.

Round Offset.



Point Octagon Offset.



Plain Pattern, (Edge View.)

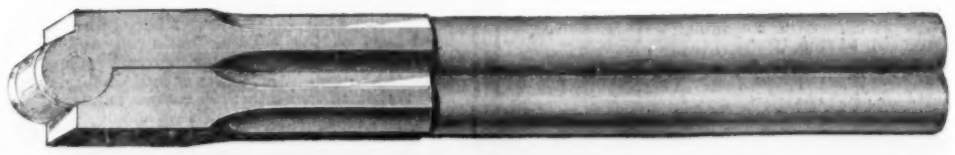
Round Stay End.

Point Octagon Stay End.

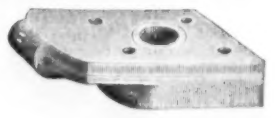
"Anvil" Pattern.

Smith's Spring Bar.

Smith's Patent Solid Top Joint.



Brewster Whiff. Plate.



Plain Spring Bar.

For description of the above and **many other** popular Forged Carriage Irons, send for 1877 Illustrated Price List.

Lightning and the Lightning Rod.

In the middle of the seventeenth century scientific opinion pointed to the identity of of the electric spark and the lightning flash. Lightning was known to burn gunpowder and light gas, dissolve and volatilise metals, rend trees and buildings, strike with blindness and destroy life, magnetize and demagnetize steel, and "turn" milk and beer sour. Benjamin Franklin produced all these effects by the electricity got from his electric machine and stored in his Leyden jars; and, in 1752, flew his famous kite at Philadelphia, bringing down electricity from the clouds. The identity of thunder and lightning with the light and crackling of the spark being thus proved, he was naturally led to apply his knowledge of electricity to the protection of life and property; and, in 1760, he set up the first lightning-rod.

It is well known that the conditions which determine a lightning discharge are similar to those which determine the discharge of a Leyden jar. If two bodies which are conductors of electricity be separated from each other by air or any other non-conducting substance, and a charge of eletricity be given to one of them, that charge will induce a charge of opposite kind to itself on the other body. There will be a mutual attraction between these two opposite electricities. And, if the two bodies be approached close enough, they will discharge into each other across the intervening air space, producing a spark. Further, if there is any angle or prominence on one of the bodies, there will be an excessive accumulation of the charge at that place, and from thence the passage of the spark will be determined. This is the principle of the Leyden jar, and of the phenomenon of lightning.

According to Sir William Thomson, the chief authority on atmospheric electricity, the earth and the upper regions of the atmosphere are, like the two conductors of the Leyden jar, oppositely electrified, the earth negatively, the upper air positively. The lower atmosphere, or firmament, acts like the non-conductor, or insulator, of the jar. Clouds passing through the atmosphere, collect on their conducting surfaces vast quantities of the electricity with which it is charged. As they approach the earth, or move horizontally over it, they silently induce powerful charges on its surface. If the cloud have ragged edges, and, above all, if the surface of the earth presents sharp prominences beneath the cloud, the electricity heaps itself up, as it were, on these points. The attraction between cloud and earth is here most powerful, and the movable cloud tends to drift toward the prominence. Every moment the attraction between the two electricities increases, until the resistance of the intervening air, which keeps them apart, begins to "totter" and give way, when they discharge into one another by the line, or lines, of least resistance, heating the ruptured air to incandescence. The electric equilibrium is thus restored. But for the prominence, no discharge might have taken place, because, on a level surface, the induced charge might never have been so heaped up. Thus, a ship on the sea, a house on a hill, a spire or tree, a horseman on an open heath, are all especially liable to precipitate a lightning discharge, which might not otherwise have taken place. On the other hand, we know that if the prominence be sharp enough, it will give off its charge easily and leak, so to speak, into the air. It therefore becomes a safety valve for the induced charge on the earth. Instead of a violent instantaneous discharge restoring equilibrium, there is a gradual union of the opposite electricities, through the point, and thus many thunder clouds are rendered harmless by being robbed of their charge. This action is well shown by the simple experiment of presenting a fine metal point, held in the hand, to a charged conductor. Very soon the induced electricity flowing from the point silently and invisibly neutralizes the charge in the conductor. On the other hand, if a blunter body, such as the knuckle, be presented to the charged body, there will be no discharge at all at the same distance, and when there is a discharge at closer quarters it will be in the form of a spark.

We are thus led to the proper function of lightning rods. They are designed to protect certain protuberances on the earth's surface, such as buildings, which are valuable to us, and can only do so by outdoing the building in two qualifications. They must offer vastly less resistance than the building to the passage of the discharge to earth, and they must have much finer points for discharging into the air. These qualifications tend to secure that by the action of the fine points, some thunder clouds will be silently discharged, and that when a discharge does occur it will pass harmlessly to earth by the rod. Let us suppose that a discharge strikes a house that is unprotected by a rod. The brick, stone and wood of the walls are much better conductors than the air inside the rooms. The path of the discharge will therefore be originally determined through the walls. For it is not, as was some time thought, that conductors divert the discharge which is already launched. Everything being stationary, the precise path of discharge is fixed before the discharge takes place. It is determined beforehand by the positions of the conductors on the earth's surface, by which induction has taken place. Those parts of the walls or rooms which are metallic are most likely to receive the discharge, since metal is a very much better conductor than dried wood or stone. Gas and water piping, lead roofing, kitchen ranges, machinery, &c., invariably form part of the track of a lightning stroke. Wherever there is a train, accidental or otherwise, of metallic bodies in a house, it tempts the discharge. Even small isolated metallic masses, such as the bells in a tower, the knocker of a door, the watch in a man's pocket, have influenced the discharge so markedly as to give rise to the popular belief in metal "attracting" lightning. The heated gas and soot of a chimney also tempts the discharge.

It is easy to see that a continuous metallic conductor, straight from the top of the building to a good contact with the earth, will be preferred by the discharge to an irregular and disruptive course through the walls. But unless the capacity of the rod for carrying the discharge be sufficiently great, a considerable part of the discharge may also find its way to earth through the walls. However good a conductor the rod may be, there is always danger of what Faraday called the "lateral spark." If a discharge of high potential electricity from a Leyden jar or induction coil be sent along a straight wire, and a lateral wire be looped so that its ends approach the wire first named, two sparks will be seen to leap across from the ends of the loop to the main wire, showing that the lateral circuit, though of much greater resistance than the direct one inclosed by it, carried off part of the discharge. In the same way a partial metallic circuit in a building may tempt a portion of the lightning discharge. If the rod is made a vastly better conductor than this lateral circuit can be, the lateral discharge, if there be one, may be very slight. But as there is no foreknowing the power of a discharge, and in order to save expensive rods, the better plan adopted is to connect all possible lateral circuits with the rod itself, or failing this, at least to place the rod as far away, electrically speaking, from such circuits as possible.

Zig-zag or forked lightning is the visible discharge in the air between cloud and cloud, or cloud and earth. It is a crack in the air heated to brightness. Sheet lightning is probably its reflection. What has been said of protecting buildings from the direct discharge applies equally in the case of the "return stroke," which, however, is fatal rather to animals than buildings. A heavily charged thunder cloud induces powerful charges on many different prominences of the earth's surface simultaneously; but the discharge in general only takes place at one point. Were the cloud a perfect conductor its whole charge would empty itself by this point. As it is, the great bulk of the charge does do so. The result is that at the instant of discharge there is a sudden return of the induced charge on the other prominences to earth. This acts like a direct stroke, and although rarely so violent, it is sufficient to destroy life, miles it may be from the scene of the direct discharge.

The conductive nature as well as the hight and contour of a building determine its liability to be struck by lightning. Chimney stalks, by a concurrence of pointed prominence and conductivity in the soot and heated gases which ascend them, are especially in danger of being struck. Churches, by reason of their belfry towers surmounted by metal crosses, public buildings, houses on hillocks, barns containing gas-generating produce, petroleum oil works, and ships at sea, are all liable to be struck. Before Sir William Snow Harris' protectors were applied to vessels, the yearly damage to English shipping amounted to nearly £10,000. Now we never hear of a single instance of a protected ship being struck. Ships are protected by copper rods inlaid in each mast, and passing along the deck beams to the ship's sides, keel and water. All the principal metallic masses of the hull are put in connection with the rods. Before telegraph posts were protected, there was great destruction among them by lightning. Each post is now made perfectly safe by a No. 8 B. W. G. galvanized iron wire, run from the top down the pole to good contact with the earth. There is reason to believe that these pole protectors, together with the network of wires overrunning our towns and roads, tend greatly to diminish the likelihood of lightning strokes, by preventing the accumulation of electricity at particular points on the earth's surface.

The practical requirements of a lightning rod relate to its three parts: the body of the rod, the air points, and the earth connection. The body of the rod should be of sufficient capacity to carry off the discharge. It is yet a moot point how much importance should be given to the surface area of a rod. Some electricians maintain that the conductivity of the mass of the rod is alone concerned in carrying off such high potential electricity as the lightning discharge; others that it depends mainly on the surface of the conductor. Recent experiments made under the administration of French telegraph lines by the Count du Moncel seem to show that surface area is an important factor in the rod's capacity. The truth is that both surface and mass conduction are efficacious, but which is most so is as yet undetermined. The French administration are in favor of less metal, made in the form of strips. There is a growing preference for galvanized iron rods over the customary copper ones, and if the French are right the larger surface of iron rods will be an additional ground of favor. Iron rods are cheaper than copper rods, they offer more resistance to mechanical injury, are less tempting to the thief, and fuse at a higher temperature (2786 deg. Fahr. for iron, as compared with 1994 deg. Fahr. for copper). On the other hand, they have a smaller conductivity than copper rods and are more liable to decay from oxidation.

The Paris Commissioners of 1823 fixed the minimum section of a lightning rod for copper 6-25 in. and for iron 3-5 in. in the side. The American practice is to make a rod have the conducting power of a copper rod ½ in. square sectional area. In this country the ½ in. strand copper wire rod is commonly employed. The early chain and link rods are to be avoided. There should be complete metallic continuity of the substance of the rod throughout its entire length. Copper rods should be riveted and iron rods welded or soldered. Copper strand rods are more pliable than solid ones, and are therefore less open to breakage. There should be no sharp bends in the rod in case the discharge prefers to leap across rather than to turn it. If the rod cannot be safely insulated from the piping or interior metal masses of the house, these should be securely connected to it. St. Paul's Cathedral offers an example of this precaution. The metal cross and ball, the lead roofing, the iron railing of the galleries, the gutters, are all connected to the rods. Every prominent part of the building has a rod, and these are connected together by cross-rods along the ridges. The sheets of lead roofing are riveted to each other by copper bands, and finally to the rods. There should, if possible, be two connections between the rod and these masses, so that a closed circuit is formed.

For an ordinary dwelling house Mr. W. H. Preece, Memb. Inst. C. E., is of opinion that

AMERICAN SCREW CO.,

Providence, R. I.

Manufacturers of

IMPROVED

Gimlet Pointed Wood Screws,

Patented

May 30,

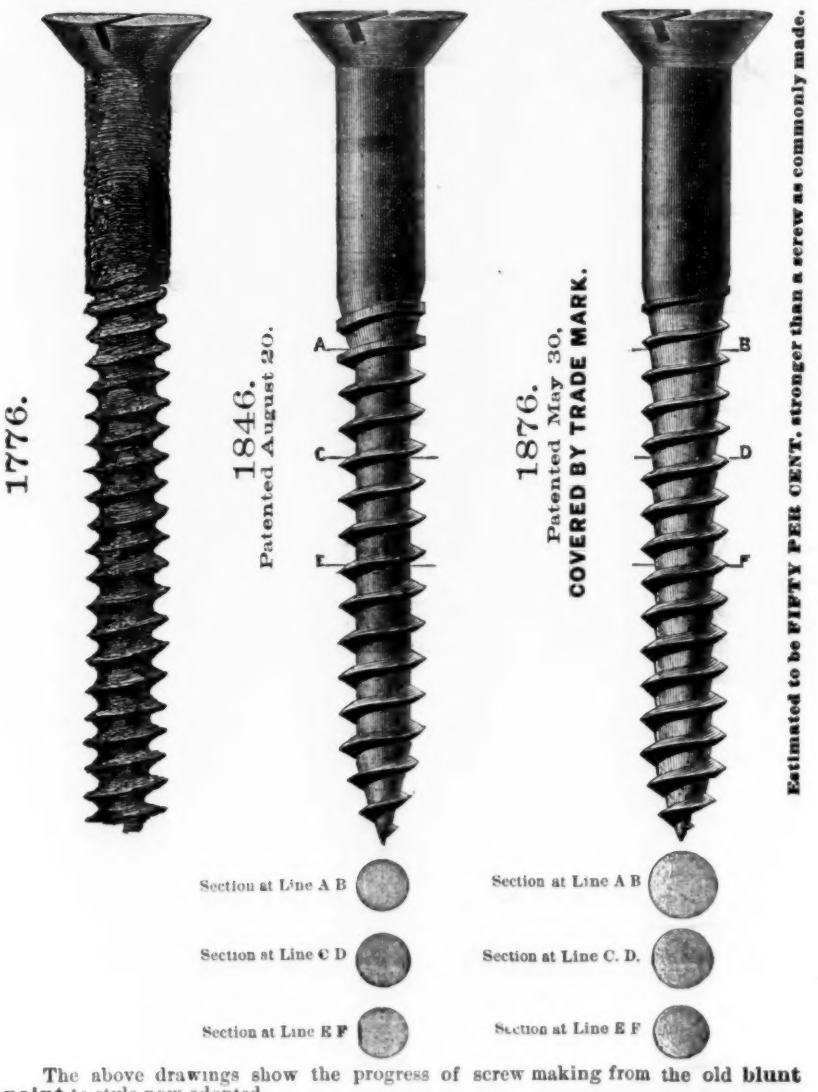
1876.

After forty years' experience we offer to the trade our **Centennial Screw, patented May 30, 1876,** as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the **improved** article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored **boxes** with new label covering end of box, and **enlarged figures** showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old **blunt point** to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our **new screw** that not only is the sharp angle avoided, but the strength very much increased, as illustrated above. See sections at lines.

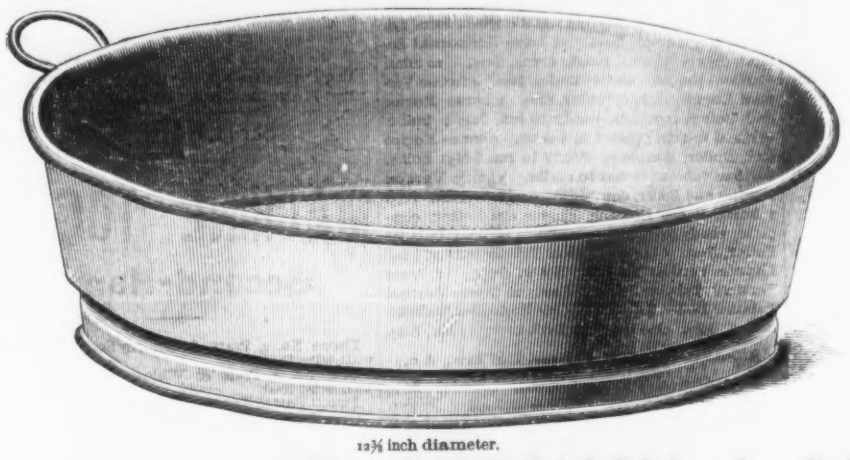
CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

KETCHAM'S

Seamless Metal-Rimmed FLOUR SIEVES.

PATENTED.



12⅜ inch diameter.

This improved Flour Sieve is fast becoming known as the leading article of its kind in the market. It is constructed of a single sheet of metal, without seams or solder, and has no rough ends to injure the hands while sifting. Neatly packed, one dozen in a box. Made from 14, 16, 18, 20, 24 or 30 mesh cloth, both iron and plated, and sold at low rates. Special cards on application.

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PLANISHED, "DEEP" and "COMMON" STAMPED, Japanned, Pieced and Miscellaneous TIN WARES,

TINNERS' TRIMMINGS, HOUSE FURNISHING HARDWARE,

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And other Specialties. Dealers in

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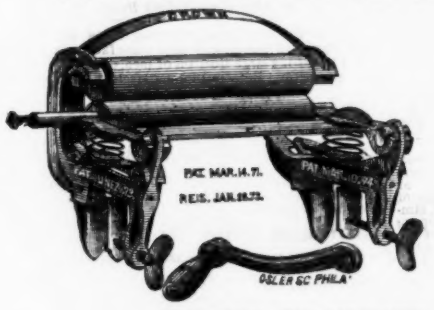
100 Beekman, 289 Pearl and 58 Cliff Streets, NEW YORK.

THE AMERICAN MACHINE COMPANY, Philadelphia, Pa.

MANUFACTURERS OF

SPECIALTIES OF LIGHT IRON WORK.



CROWN WRINGERS,

with Patent White Rubber Rolls, Galvanized Malleable Iron Frame Work, Bessemer Steel Springs, &c. Noted for Strength, Durability, Efficiency and Simplicity.

No. 2, Rolls 1⅝ in. diam., 10 in. long. No. 2¾, Rolls 1¾ in. diam., 12 in. long.
No. 3, Rolls 1⅞ in. diam., 12 in. long. No. 4, Rolls 2 in. diam., 12 in. long.

CROWN FLUTING MACHINES,

with valuable improvements over other style Machines. Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.

Sizes (length of Rolls), 4½ inch, 6 inch and 8 inch.
Rolls with 10, 12, 15, 18, 22, 26 and 30 flutes.

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Extra Rollers.—8 in., $2·25; 6 in., $1·50; 4 in., $1·25
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ALSO LANE'S PORTABLE COFFEE ROASTER

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The Star Friction Mat,

To light Matches on.

THE STAR FRICTION MAT,

With Pocket to hold the Matches.

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Copper Kettles,

And all kinds of Copper work, from 2 to 50 gallons P. S.—Send for price list.

a No. 4 B. W. G. galvanized iron wire is sufficient protection. Its diameter is one-fourth inch. A half-inch iron wire strand, he believes ample for all cases of dwelling house. For castellated and Gothic houses, more than one rod of the No. 4 gauge may be necessary.

The old controversy of "points or no points" has been settled in favor of points. It was formerly thought by many that it was only necessary that the end of the rod should be a point in comparison with the area of the cloud or charged body, and blunt rods, some even with balls, were used. But all now agree as to the need of fine pointed rods. To prevent blunting by oxidation, these are usually either of gilt copper or made of platinum. A spike of them may be used with advantage. They should overtop the chimneys by a yard or so, not higher than will admit of their inspection, and they should be kept clean and bright.

The worth of the rod entirely fails if the earth connection is bad. Indeed it is then rather a source of danger, for the discharge it has courted will otherwise make earth through the building the rod is designed to protect. For earth connection points have also been used, but experience shows that large metallic surfaces are better. The aim in seeking an earth connection is to put the rod in good conducting contact with the earth's moisture. Therefore wells or marshes are the best local earths. Bodies of natural water, water mains in towns, tree roots, moist sandy soil, are to be sought by the end of the rod. A moist earth contact is perhaps preferable to a purely water contact. If water pipes are taken for earth, the rod must be securely soldered in a place where it can be often easily examined. Artificial earth plates are best made of sheet copper. They should have a large area, and the rod should be riveted to them. Through them the rod should make connection with the moist earth.

Where moisture is not to be had, beds of charcoal or coke must be used. The end of the rod should be carried below the walls and foundations of the building; it should then be turned from the building at a right angle for 12 or 16 feet in a horizontal ditch or trough filled with charcoal, and terminated by an earth plate in the well or moist place selected. If there is no such place it should terminate in the middle of a bore 10 or 15 feet deep, filled with freshly heated charcoal. The charcoal helps to conduct and keeps the rod from oxidizing.

The radius of the area over which a rod exercises a protecting influence was given out by the French commissioners as equal to twice the hight; but in practice it is now generally taken as being equal to the hight of the rod.

Next to the careful construction of a rod there is nothing so important as the inspection of it, which should be regularly and systematically carried out. If lightning is seen playing about the points, it is a sign they are defective; if a glow discharge is seen they are working well. It should be observed if the points keep clean and fine, if the rod keeps entire, and if the earth connection continues secure. There is generally a current flowing from air to earth in a rod, and this tends to corrode the earth portion of the rod by the electrolytic action. Iron wall staples used in connexion with copper rods also cause decay in rain. Mischief and accident are sources of mechanical injury. These things must be looked out for during good weather, and not on the approach of a storm.

Heating Buildings and Rendering Water Soft.*

The following is the substance of a report read by a gentleman at a scientific meeting recently held in England:

In speaking of heating buildings he cited the case of an extensive lunatic asylum. The author stated that the asylum extended over many acres, comprising as it did numerous separate "blocks," as they are technically called, for the reception of the patients, for infirmaries, the administration department and other purposes. In order to obtain economy and simplicity in management, it was desirable that the whole of this extensive acreage of buildings should be heated and supplied with hot water for baths and other purposes from one source of heat. It was well known that in a single house, or even in a single large building, the circulation of hot water could be automatically maintained by the mere difference in gravity between the hotter ascending column of water and the cooler and heavier descending column. The power thus obtained, however, was wholly inadequate to cope with the thousands of yards—miles, indeed—of pipes at Banstead. To overcome the difficulty and to enable the building to be warmed and supplied from a single source of heat, the author had devised the plan of placing in the engine house a centrifugal pump, which forced the water along the outgoing main and exhausted it along the return main. These mains were conveyed side by side in trenches throughout the whole enormous establishment. They were not connected at their ends, but at each block of buildings a pipe, controlled by a valve, led the hot water into that block and supplied the whole of the heating coils therein, the outlet pipe from this system of coils being united to the return main. Thus the water circulates through each block with the velocity due to the difference of pressure between the outgoing and the return mains, instead of circulating with the feeble velocity arising from a mere difference in temperature. It would be seen that there was practically no waste of fuel in the employment of steam to work the centrifugal engine, because the waste steam of the engine was used to aid in heating the water. The author of the paper proceeded to point out how this system of forced circulation would render it possible to lay on to groups of building, such as streets of workmen's dwellings, a supply of hot water for heating their dwellings and for washing purposes. The water was pure spring water, obtained from a deep well in the chalk. This water was about 17 degrees of hardness, and was therefore a perfectly fit water for dietetic purposes in its natural condition, but on being boiled it deposited the carbonate of lime in the boilers and pipes through which it was conveyed, and thus the author of the paper was led to urge upon the magistrates the necessity, if they wished to preserve their boilers and heating apparatus from being coated with carbonate of lime, of softening the water by Dr. Clark's process. This process is known to many as an extremely beautiful and simple one. The hardness of chalk waters depends principally upon their containing a certain amount of bicarbonate of lime in solution. Lime is soluble in water readily, bicarbonate of lime is soluble in water readily, but carbonate of lime is insoluable. If, therefore, the bicarbonate could be converted into a carbonate it would be deposited from the water, which would thus become soft. This conversion of the bicarbonate into a carbonate is effected in Clark's process by mixing with the natural water containing the bicarbonate a small portion, one-tenth to an eighth, of water in which lime has been dissolved. On these waters being united they instantly become milky, and after being allowed to stand for some hours the water again becomes bright, the carbonate of lime having fallen to the bottom. This operation, however, it will be seen, requires very large depositing tanks and a considerable expense, therefore, in plant, but Mr. Porter has recently invented an improvement upon Clark's process which appears to promise excellent results, and it has, after experiment, been adopted at Banstead. The principle and mode of treatment, as far as the chemistry is concerned, are precisely the same as Dr. Clark's, but instead of waiting the slow proces of deposition to separate the carbonate of lime from the water, the mixed water is passed through filter presses of a peculiar construction, wherein the very carbonate of lime itself is made the filtering medium for itself, and in this manner, within a quarter of an hour of the mixture having been made, perfectly pure and soft water issued forth. There are four presses at Banstead, and these are sufficient to filter an average hourly quantity of 60,000 gallons of the purest and softest water. This water is pumped into the tank on a tower 80 feet high. The tank contains 240,000 gallons. Six-inch pipes, so as to avoid friction, are laid all over the asylum, and internal and external hydrants are fitted thereto. Moreover, if a fire continued so long that the tank was exhausted, the engines which draw the water from the well and raise it into the tank can be caused to act direct as fire engines. The whole of the work, except the Porter-Clark process, has been carried out by Messrs. Eastons and Anderson, and the author of the paper was the engineer to whom the Middlesex magistrates confided the design and superintendence of the work.

* A paper read before the Mechanical Science Section of the British Association at Plymouth, England, by Mr. F. J. Bramwell, F. R. S., on a New Mode of Circulating Hot Water through very Large Buildings, and upon a New Mode of Softening Water, as carried out at the new lunatic asylum (the third) for the county of Middlesex, situated on Banstead Downs, in Surrey.

A Fire Started by a Milk Can.—A concave reflector, like a convex lens, concentrates the rays of light that fall upon it, and can, under proper circumstances, be used as a burning glass. A case in which the bottom of a milk can played the part of a burning glass to the damage of property is reported by J. H. Brownell, who writes to the Aurora (Ill.) *Beacon* a curious circumstance which occurred a few days ago at North Aurora: David Long, who carries milk to the cheese factory, had his milk can turned bottom up on a table near the kitchen door, to be purified by the sun. This was the usual place of sunning the milk can. One day about noon Mrs. Long discovered the smell of burning wood, and called the attention of Mr. Long to it. After some search he found the window blind above the can on fire. A hole had already been burned through, and as the blind was open the fire was about to burn into the weather-boards of the house. Had the family been from home no doubt the house would have been burned. The fire was caused by the hollow, bright bottom of the milk can, forming a concave reflector which gathered the parallel rays of the sun into a focus with sufficient power to set fire to wood. Globular bottles filled with water have frequently caused fires when hung in the sun's rays by bringing the rays to a focus upon some combustible material. The bottom of a large can, when the tin is bright and of proper shape, might be easily made to start a fire. In fact, all that is necessary is a large concave reflecting surface of any kind, adjusted so as to throw the focus or point at which the rays meet upon some substance easily set on fire.

Unlawful Forms for Business Cards.—Many complaints have reached the Treasury Department that merchants and business men in various parts of the country have been in the habit of printing business cards bearing such close appearance to the United States and National Bank issues that many people have been deceived thereby, and quantities of it have been passed as good money by persons who have gathered a number of these cards. Some of the samples received at the Secret Service Division at Washington are of a character to deceive even observant persons; certain samples just received, representing fractional currency and five and ten dollar notes, while they bear upon their face the fact that they are not really genuine, are so very close in their imitation as to have deceived many people, and there is evidence here of one of these cards, issued by a firm in Philadelphia without any evil intent whatever, having been passed upon a number of people. These issues are all in violation of law, of which the persons employing such means of advertising their business seem to be ignorant. Section 5430 of the Revised Statutes, in reference thereto, forbids the engraving or printing of anything in the impression or the likeness of any United States obligation or other security, or any part thereof, except under the authority of the Secretary of the Treasury. The penalty is a heavy fine and imprisonment. The practice, however, continues, and all because of ignorance of the law. Many indictments have been found against persons on this account, and the Department now intends to prosecute to the full extent further continuations of this business as a matter of protection to the community, the poor and more ignorant members of which are very thoroughly imposed upon.

INDUSTRIAL ITEMS.

MAINE.

Work at the Portland Company's locomotive works is now very lively, and the aspect in that vicinity is much as it was years ago, when times were easy and railroads were building all over the country. Instead of employing from 50 to 75 hands, as they did last winter, the pay roll now shows about 300 at work. They have been at work changing the gauge of engines for the five railroads in this section which have just reduced from the broad to the standard gauge. There are now eight engines belonging to the several roads in the shops and more will be received in a few days. The company have been at work on these contracts about a month and expect them to last a month longer.

MASSACHUSETTS.

The John Russell Cutlery Company, at Turner's Falls, are running their pocket knife department to its full capacity.

The Clark & Chapman Machine Company, of Turner's Falls, are receiving orders for their Crocker fire pumps faster than they can get them out.

The Nickel Mining Company, of Lowell, are making active preparations for crushing their ore and refining their metal. It is 61 feet from the platform of the company's mine to the bottom of the shaft—where there are drifts running in different directions. At the bottom the ore is uniform in quality and the assays are said to compare favorably with the richest nickel ores that are worked. The company is employing all the hands that can work to advantage in the mine.

Hill, Clarke & Co., of Boston, shipped a large lot of shafting, hangers and pulleys to Amsterdam, Holland, and several steam engines and some machinists' hardware to Germany.

The Athol Machine Company have an order for ten dozen of their meat choppers to go to England.

CONNECTICUT.

The Connecticut Screw Company, of Tariffville, have recently placed some improved machinery in their factory, and further outlay and improvement will be unanimously recommended to the stockholders by the directors.

The mammoth sugar mill which has been in process of manufacture for several months at Farrel's foundry, at Ansonia, for a Cuban firm was finished last month, but no vessel has yet been found large enough to transport it. This mill is said to be the largest in the world, weighing 300 tons, and costing $30,000 in gold. There are also making two vacuum pans, each capable of holding 10 tons of sugar and weighing 50 tons. Each pan requires two pneumatic engines, which are to cost $24,000 and $20,000 respectively, and are to be finished the last of this month.

NEW YORK.

The production of mechanical toys seems to be increasing to such an extent in this country as to make it probable that this will be one of the largest of the recent additions to our industries. Geo. Schlesinger & Co., 182 to 190 Avenue C, New York city, have recently established very extensive works for the manufacture of tin and mechanical toys, and it is said that in this line of goods importation has ceased. The firm are pushing an export trade in toys, and sending goods both to England and Germany.

PENNSYLVANIA.

Chas. W. Ervien & Co., Philadelphia, have just shipped a small vertical engine, on an order received from the Sandwich Islands.

Lovegrove & Co., Philadelphia, have six orders on hand for engines and boilers to be shipped to various cities in Germany. They have also received inquiries from Sweden, which are likely to result in business.

The work of rebuilding the furnaces of the Kemble Coal and Iron Company, at Riddlesburg, Bedford county, has been completed, but no time is specified for commencing work.

The Millerstown Iron Company have shipped a large invoice of pig iron to Richmond, Va. The furnace continues making an excellent quality of iron and the demand is good.

A committee of furnace men have examined the furnace of the Warwick Iron Company, with a view to ascertaining what defects of construction, if any, exist.

The two furnaces in blast at Birdsboro made 456 tons of iron last week, about one-fourth of which was No. 1.

The Nimson Axle Works, Catasauqua, will resume operations next week.

The needle works of William Smith, East Coventry township, Chester county, have been in continuous operation for twenty-one years. There has not been a lack of work at any time, and there has been no suspension except on national or other holidays. There are fourteen persons employed, and the establishment has plenty of orders.

From the Altoona *Tribune* we learn that during the last month the Springfield mines, of Blair county, shipped 5525 tons of iron ore, the largest shipment ever made from that district.

A number of vise hands at the P. & R. R. Co.'s shops, at Reading, have been suspended. The lathe department is working fairly full.

The Moslem Furnace is making preparations to go into full operation.

Drawings, plans and specifications for a pair of anthracite furnaces for a New Jersey firm have been prepared at the Weimer Machine Works, Lebanon, during the past three weeks, and plans are also on hand for the rebuilding of one of the old Cumberland Valley furnaces. William Firmstone, previous to his death, had ordered from the company one of P. L. Weimer's high speed blowing engines, to be used at one of his company's Longdale furnaces, in Virginia. The Roane Iron and Steel Company, of Rockwood, Tenn., have ordered one of P. L. Weimer's furnace charging apparatus, to be shipped immediately.

The puddle mill of the Bethlehem Iron Company has resumed operations after a stoppage of seven weeks. Eight puddle furnaces are working, which will give employment to about 100 men.

The Danville Iron Works and the Co-operative Iron Works are working on full time.

The Westerman Iron Company, Sharon, are running full double turn.

Kimberly, Carnes & Co., Sharon, are running full.

The Ætna Iron Works (Limited), New Castle, are running full. The new nail factory is a great improvement.

The Ætna and Crowther furnaces are in blast at New Castle.

Bradley, Reis & Co.'s mill (sheet), New Castle, is running to its full capacity.

Reis, Brown & Berger's mill and furnaces at New Castle, are all still idle.

PITTSBURGH AND VICINITY.

H. Lloyd, Son & Co. have resumed work after an idleness of eleven weeks.

Stack No. 2 of the Lucy Furnace was blown in Tuesday morning. We are not able to give results at this writing. The stack will run for awhile on mill iron. No. 1 will continue on Bessemer. The latter is averaging 100 tons per day.

Messrs. Zug & Co. have a letter from Springfield, Ohio, from a party to whom they made their first shipment, who writes: "We have had nails from nearly all mills, and we consider yours the best." This is quite good for nails from a locality where it is charged they are made from old rails.

The Soho Furnace is to blow in a week from Monday. Ore is being received, and everything is in readiness for a start. No trouble was experienced by the proprietors in buying all the first-class ore they wanted.

Messrs. Lewis, Dalzell & Co. are about to engage in the manufacture of a patent sheet iron keg and bucket, for powder, oil, varnish, white lead, putty, &c. The machinery, which is new, has been ordered, and the manufacture will be undertaken at an early day.

Robinson, Rea & Co. are building a new continuous iron mill for Anderson & Passavant to roll the steel wire for the East River Bridge. They are also building a 30-inch engine for the same firm for their new mill near the gas works.

Messrs. Lindsay & McCutcheon, the well-known hoop iron manufacturers, of this city, are about to engage in the manufacture of horse-shoes. A new machine with a claimed capacity of 3500 shoes per hour is nearly completed. The machine takes the iron in the bar, cuts, bends, clamps and swedges it, and delivers a shoe ready for the market.

WEST VIRGINIA.

Quinnimont Furnace is out of blast for repairs. They have 400 tons No. 2 Foundry and 300 tons mill on hand.

The Top Mill, Wheeling, has suspended operations for a few days, as a mark of respect for the late Adams Dodson, who was vice-president and one of the largest owners of the mill.

OHIO.

The Youngstown Iron Co. have a large contract for furnishing cotton ties to a Texas firm.

The Russia Iron Works, Niles, are running double turn.

The Girard Mill is idle.

The Falcon Iron and Nail Co., Niles, are running about one-third time.

The Hogen Elbow Co., Cleveland, are running night and day on orders.

The Sheridan Horse Nail Co., Cleveland, are in readiness to begin the manufacture of hair-pins, and the machinery will soon be in operation.

From 6 to 8 tons of good steel are turned out each day from the works of William Jones, near the Union Mills, Cleveland.

The Akron Iron Co. have been sued by Jones & Laughlins for an alleged infringement on their cold rolling process.

The increase in the business of the Cleveland Rolling Mill Co. demands more room, and negotiations have been successful for land in the rear of the wire mills in the eighteenth ward. An extension of 300 feet and the erection of new fire-proof buildings will soon ensue.

There are said to be 100,000 tons of iron ore on the docks at Ashtabula and 150,000 tons on the C. & P. docks alone at Cleveland.

MISSOURI.

The 16-pot plate glass Siemens furnace, lately built by the Crystal Plate Glass Co., of St. Louis, has been started up and is working very satisfactorily. It is reported to be saving 60 per cent. of fuel and giving a greatly increased yield of glass, with a decided improvement in the quality. We believe there is also a great saving in pots, owing to the fact that with the Siemens furnace the breakage is slight.

HARDWARE MERCANTILE AGENCY

Report Just Published.

Better than all the general Mercantile Agencies for HARDWARE, IRON, STEEL, GUNS and AGRICULTURAL IMPLEMENTS. $25 a year.

WM. P. CLEARY,

P. O. Box 1790. *76 Chambers St., N. Y.*

WANTED.—Men of undoubted ability and character to solicit subscriptions.

Foundry Men,

Manufacturers of Car Springs, Galvanizers and Manufacturers of Spring Steel may secure the most profitable work ever made in their line.

Address **J. S. LASH & CO.,**

725 North 3d St., Philadelphia, Pa.

Wanted,

By a young man who has had 8 years' experience in the manufacture of Hardware, in connection with traveling, any position where he can make himself useful. Has an extensive and valuable acquaintance with all the **Western Hardware Trade**, and is used to all kinds of office work. Address **STRAP HINGE.**

Office of *The Iron Age*, 83 Reade St., N. Y.

An Engineer and Machinist,

With 20 years' experience, is open for an engagement. Is competent to take charge of a public building as engineer and janitor.

Satisfactory references can be furnished.

Address **J. M.,**

Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

The Sherman Process Company,

PROPRIETORS OF THE

"SHERMAN" PATENTS,

Is now ready to

Issue Licenses to use the said Process under a Royalty.

The Process is used to great profit in the Puddling Furnace, Martin-Siemens Furnace, Bessemer Converter, Crucible, and for Gray Iron Castings.

The use of the Process does not involve any changes in the furnaces or in the present manner of working them, nor does it increase the labor, but on the contrary saves material, fuel, labor and time.

The chemicals used are not expensive, their cost not exceeding 25 cents per ton of product, and the charge for royalty is placed at a low price so as to bring the Process into general use.

By the use of this Process a large percentage of the cheaper grades of irons and steels can be made into a good merchantable product.

Irons which have been found impossible to use either alone or in mixture with other irons are now being profitably used by means of this Process.

It improves the working of both poor and good irons or steels, a better product being obtained by its use than is possible without it. It makes the molten metal more fluid and the product more sound, homogeneous and ductile.

It makes less skull and scrap and less waste in the finished product.

It greatly improves sulphurous and phosphorus irons and steels, making them less red and cold short, and produces a more even product.

For castings that are to be tapped and have threads cut upon them, it allows a close, strong iron to be used, leaving it soft for the tool to readily cut.

By the use of this Process in the Bessemer or Martin-Siemens furnace, good steel rails can be made from a mixture of from 30 to 60 of old iron rails and the balance good stock. Thousands of tons of steel rails made by this Process, as above, are now being used in France.

The Process will be demonstrated without expense, at the works of parties applying, and the amount of royalty to be charged for its use will be furnished upon application to

The Sherman Process Co.,

No. 9 Pemberton Square,

BOSTON, MASS.

BY T. F. STEWART.

TRUSTEE'S SALE

OF

Very Valuable

Charcoal Furnace,

SITUATE AT

ESCANABA, MICHIGAN.

The undersigned will sell at AUCTION, for account of whom it may concern, at the Chamber of Commerce, in the city of Pittsburgh, Pa., on

THURSDAY, OCTOBER 11th, 1877,

at 2 o'clock p. m., the very valuable property known as the

ESCANABA FURNACE,

with all its appurtenances, together with about **27,000** ACRES OF WOOD LANDS, very carefully selected by experts, on which have been erected **49** charcoal kilns. The furnace is 12 feet bosh, 51 feet stack, iron truss roof, thoroughly fireproof, with buildings, foundations and hoisting machinery for a second stack, all constructed in the best manner. There are numerous tenement houses, store houses and other buildings, and a large dock on the bay, adjoining the furnace, with unusual facilities for procuring limestone.

There will be sold in conjunction with the realty, a large amount of personal property, comprising probably TEN THOUSAND CORDS OF WOOD, a large quantity of Limestone, Iron Ore, Charcoal Goods in Store, Wagons, &c.

This property MUST BE SOLD for the benefit of creditors. It is probably the finest Charcoal Furnace in the country, the wood lands affording an almost inexhaustible supply of hard wood, and it must, in the near future, become exceedingly valuable.

TERMS.—Cash; ten per cent. on day of sale, and balance within thirty days thereafter.

For particulars apply to the Trustee at Pittsburgh.

J. R. McCUNE, Trustee.

T. F. STEWART, Auctioneer.

Iron Foundry For Sale or Rent.

The foundry of the IVES MFG. CO., in the village of Medina, is offered for sale, or will be leased for a term of years, on very favorable terms, to any party desiring to engage in the business and who will purchase the patterns and machinery of the company. The location of the premises is most desirable, being on the bank of the Erie Canal and on the main business street of one of the most flourishing villages in Western New York, and near by the N. Y. Central & H. R. Railroad. Special low rates of freight to and from all points east or west can be effected. The patterns are good for Sinks, Pipe and Fittings, and a general line of Plumbers' Iron Ware, for which there is a large established trade and increasing demand.

Correspondence or personal inspection solicited up to October 3d; if not disposed of, a public sale will be held on Wednesday, Oct. 10, at 1½ o'clock p. m., on the premises. A schedule of the property will be furnished on application.

E. S. WHALEN, Assignee.

MEDINA, N. Y., Sept. 17, 1877.

SITUATION WANTED.—As Salesman or Bookkeeper, by a young man, unmarried, who has filled like positions in a Hardware manufacturing company in New York for ten years past. He is ready to go to any part of the country at the shortest notice. Highest references. Address

B. L. B.,

Office of *The Iron Age*, 83 Reade St., New York.

Hardware and House Furnishing — Situation wanted by a young man as salesman in either capacity. Has had ten years' experience with last employer. Can give all reference required as to honesty and ability.

Salesman,

Office of *The Iron Age*, 83 Reade St., N. Y.

Special Notices.

FOR SALE,

THE FOLLOWING

New and Second-Hand Boilers Engines, &c.

New Engines and Boilers.

15 horse Horizontal Engine, 8x12 cylinder double crank, $230. 15 horse Horizontal Engine, 8x12 cylinder, single crank, $230. 20 horse Horizontal Engine, 9½x13 cylinder, single crank, $275. 10 horse Vertical Engine, 6½x8 cylinder, $250. 4 horse Vertical Engine, 4½x5 cylinder, $110. 4 horse Engine and Boiler, complete, ready to run, $240; boiler vertical tubular; tested to 150 lbs. 5 horse Engine and Boiler, complete, ready to run, $285; boiler, vertical tubular, tested to 150 lbs. 3 horse Vertical Engine and Boiler, complete, ready to run, $175. 8 horse Bacon Hoisting Engine and Boiler, complete, ready to run, $575. 4 horse Vertical Tubular Boiler, $125. 6 horse Vertical Tubular Boiler, $145. 8 horse Vertical Tubular Boiler, $160. 11 horse Vertical Tubular Boiler, $200. 16 horse Vertical Tubular Boiler, $290. 40 horse Horizontal Tubular Boiler, $580. One Upright Drill, swing 24 in., $125.

Second-Hand Engines, Boilers, &c.

60 horse Horizontal Engine, 16x20 cylinder, $800, good order. 60 horse Locomotive Style Boiler, $500, good order. 6 horse Locomotive Style Boiler, $125, good order. 4 horse Vertical Tubular Boiler, good as new, $100. 12 horse Horizontal Engine, 7½x10 cylinder, pump, heater and governor, $225, good as new. 11 horse Vertical Engine, 7x10 cylinder, $200. 8 horse Horizontal Engine, 6x12 cylinder, $125, good order.

We also have two new power or hand Pipe Cutting and Threading Machines, cut from ⅛ to 2 in. pipe, with full sets of dies, ⅛ to 2 nipple sockets, price $60 each; several bench and foot lathes from $30 to $50.

Also Steam Pumps, Pipe, Belting, Valves, Fittings, &c., &c., &c.

Write us, stating what you want, new or second-hand, and we will answer cheerfully.

Lovegrove & Co.,

125 N. Fourth St., Philadelphia.

Ramsey's Car Truck Shifting Apparatus.

A Practical Testimonial.

PENNSYLVANIA & NEW YORK CANAL & R. R. Co.,
Office of General Superintendent,
SAYRE, PA., August 17th, 1877.

To whom it may concern: This company has just constructed, at Erie Railway Junction, near Waverly, N. Y., a RAMSEY CAR TRUCK SHIFTING APPARATUS.

The undersigned, who have examined the construction and operation of this apparatus, have no hesitation in recommending its adoption for changing car trucks, or transferring through cars between roads of different gauges, and believe it to be the cheapest, simplest, most reliable and rapid device for that purpose now in use. At the trial to-day, with some parts of the machinery unfinished, a box-car was run over the pit, a distance of 200 feet, changing the trucks in 2 minutes and 15 seconds for the whole operation. It is believed that, with a longer pit and an increased number of side trucks, the time can be reduced to one minute per car, with no other motive power than gravity, and without the use of skilled labor.

R. A. PACKER, Gen'l Supt.,
Penna. and New York Canal and R. R. Co.
R. F. GOODMAN, Ass't Supt.,
Penna. and New York Canal and R. R. Co.
J. N. WEAVER, Acting Master Mechanic,
Penna. and New York Canal and R. R. Co.
JOHN TAYLOR, Gen'l Freight Agent,
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Geneva, Ithaca and Sayre R. R. Co.

☞ Any information desired can be obtained by addressing

RAMSEY & SCARLETT,

Box 162, Cobourg, Ontario, Canada.

Hardware Business For Sale.

The old Stand, Stock and Good Will of the late E. H. Fogg. This store commands the largest wholesale and retail trade east of Portland. The best of help, and doing a prosperous business.

Address **H. H. FOGG,**

Bangor, Me.

SPECIAL NOTICE.

The undersigned, in view of the **Paris Exhibition** of 1878, begs to inform his friends that he continues to make translations of Catalogues, Prices-current, Circulars, Correspondence, &c., from and into the

ENGLISH,
FRENCH,
GERMAN
and **SPANISH,**

and that he bestows special attention upon a strictly correct rendering of **Technical Expressions** in matters relating to **Machinery, Metallurgy, Hydraulics,** &c. The very best reference will be furnished from leading manufacturers in this city, Philadelphia and elsewhere, for whom he has translated. If desired, estimates will be procured for the setting up, electrotyping and printing of catalogues, &c., in the above languages. **C. KIRCHHOFF,**

Metal Reporter of The Iron Age,

83 Reade St., New York.

To Hardware Manufacturers.—A young man for the past six years connected with a Hardware house as bookkeeper and salesman, desires employment. References if desired.

Address N. T. H.,

Office of *The Iron Age*, 83 Reade St., N. Y.

A GENTLEMAN HAVING A FOUR YEARS' experience in the agricultural implement trade on the continent, desires to make an engagement in a similar line, or in machinery or manufactures.

Has a first-class acquaintance in Germany, Austria, Belgium, Holland, Sweden, France and Russia. Best of references given. Address

P. O. Box 972, Auburn, N. Y.

Lamberson's HARDWARE PRICE BOOK.

Half leather - - - - -	$10.00,
Full " - - - - - -	12.00,
" " (Genuine Russia) - -	14.00,

Send for descriptive circular to

BUELL LAMBERSON,
97 Chambers St., New York.

Inventors

of articles in Builders' Hardware desiring to dispose of same by sale or on royalty, on reasonable terms, may address **IRONMONGER,**

Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

CHARLES OTTO,

P. O. Box - - - 1192.

(ESTABLISHED 1854.)

Importer & Dealer in HARDWARE,

Manufacturers' Agent, etc

12 & 14 Front and 250 & 252 Market St., } *San Francisco.*

I am prepared to make arrangements with Eastern manufacturers to act as their agent for the sale of Hardware, etc., on the Pacific Coast.

REFERENCES:

Sargent & Co., 37 Chambers Street, New York.
VanWagoner & Williams, 82 Beekman St., N. Y
T. Hessenbruch & Co., 10 N. 5th St., Philadelphia
The Pennsylvania Tack Works, Norristown, Pa.
The Pacific Bank, San Francisco

SEPTEMBER LIST.

MACHINE TOOLS,

Second-Hand.

Three No. 2, Pratt & Whitney Screw Machines, with wire feed.
One No. 1, Pratt & Whitney Screw Machine, with wire feed.
Two "Belden" Screw Machines.
One Brainerd Index Milling Machine.
One No. 3, Geared Stiles Press.
One No. 4, Geared Stiles Press.
Two Engine Lathes, 13 in. swing, 6 ft. bed.
Two Engine Lathes, 22 in. swing, 8 ft. bed.
One Engine Lathe, 76 in. swing, 36 ft. bed.
One Planer, planes 70 in. wide, 52 in. high, 27 ft. long.
One Engine Lathe, 15 in. swing, 6 ft. bed; one Engine Lathe, 15 in. swing, 7 ft. bed; one Engine Lathe, 18 in. swing, 8 ft. bed; one Engine Lathe, 22 in. swing, 16 ft. bed; one 21 in. swing Upright Drill; three 4-spindle Drills; four common Milling Machines; one Brown & Sharpe Universal Milling Machine; one 36x36x9 ft. Planer; one 8 in. Shaper; one Gear Cutter; one 2-spindle Profiling Machine; one No. 1 Bliss & Williams Press; one "Bement" No. 2 Cotter and Key Seat Drill; one new "Hardaway" Bolt Heading Machine, to head up to ⅞ in. bolts; one new Hardaway Bolt Heading Machine to head up to 1¼ inch bolts; one "Merriman" Bolt Cutter, to cut up to 1¼ in. bolts; one "Davy Bros." 1200 lb. Steam Hammer; one "Ferris & Miles" 2000 lb. Steam Hammer.

Please specify which of the above tools you want and we will forward all particulars.

The above tools will be sold very low, and can be seen at

The George Place Machinery Agency,

121 Chambers and 103 Reade Sts., N. Y.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,

IRON AND STEEL,

Care of *P. O. Box 813, Bridgeport, Conn.*

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,
101 & 103 Duane St., N. Y.

SCHMIDT & ELBERS,

BREMEN, GERMANY.

Dealers Exclusively in American Hardware.

Manufacturers who wish to have their goods introduced in Germany, please correspond.

Important to Manufacturers.

BISSELL, WELLES & MILLET,

Auctioneers and Commission Merchants, No. 15 Murray St., New York,

Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large lines of goods are unsurpassed. Advances made if desired.

TO LET,

A Light, Handsome Office.

Possession Immediately.

HERMANN BOKER & CO.,
101 Duane Street, N. Y.

New & Second Hand Machinery & Tools

One 30 in.x6 ft. Pond planer; one 21 in.x6 ft. Ferriss & Miles, do.; three 16 in.x3 ft. Pratt & Whitney, do.; one 15 in.x3 ft. New Haven, do.; twelve Pratt & Whitney milling machines; two extra heavy milling machines; one double head, do., Wood, Light & Co., makers; three bolt cutters, Wm. Sellers & Co., makers; one heavy chucking lathe; one 14 in. Putnam Shaper; one 8 in. N. Y. S. E. Co., do.; one heavy shear, cuts 2½ in.x¼ in. iron; one 700 lb. steam hammer; one 1200 lb. do.; six 16 in.x8 ft. lathes; six 14 in.x6 ft., do.; two heavy upright drills; two Merrill Drops, 600 and 1000 lbs. hammers; thirty spinning lathes, 12 in. swing, 4 and 5 ft. beds. Lot small engines and other machinery.

The Bullard Machine Co, Limited,

14 Dey Street, New York.

SPECIAL NOTICE.

The undersigned offer their services as agents to

American Producers of Metals.

They represent foreign brands of

Zinc, Russia Iron, Hoop Iron, Window Glass, Cutlery and Guns.

LOUIS WINDMULLER & ROELKER,

20 Reade Street, N. Y.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address ***CAR WHEEL FOUNDRY,***

P. O. Box 134, Selma, Alabama.

Wanted,

A General Agent in every State in the Union, for the sale of Wrought Iron Highway Bridges, new in design, combining maximum in strength and minimum in cost. For particulars address

WM. O. DOUGLAS,

Binghamton, N. Y.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, Sept. 26, 1877.

The past week has been uneventful in the financial markets. The money market shows somewhat increased firmness, the rates on call advancing to 6 @ 7 per cent., and the discount rate on desirable business paper to 6 @ 8 per cent. The demand for currency is a gratifying indication of the improved condition of general business. The Controller of the Currency says that the additional circulation of national bank notes issued during the present month will not be less than a million dollars, and the indications are that a much larger amount will be issued during the months of October and November for the purpose of supplying banks with currency necessary for the movement of the crops.

The gold market has been dull and without important features. The following table shows the daily range of the premium:

	Highest.	Lowest.
Thursday	103¼	103⅛
Friday	103⅛	103⅛
Saturday	103⅛	103
Monday	103¼	103⅛
Tuesday	103¼	103⅛
Wednesday	103¼	103⅛

The market for government bonds has been firm, with an advance in quotations. State bonds are generally steady. Railroad bonds firm.

The stock market has been irregular, but generally heavy and weak, especially for coal shares. The principal dealings have been in Lake Shore, Western Union, D., L. & W., Michigan Central, St. Paul and Northwest. We give below the closing quotations of active shares.

The bank statement shows a loss in total reserve of $2,229,800, made up of $1,591,500 legal tender notes and $638,300 specie. The surplus reserve was reduced less because of the reduction in deposit liabilities; it is now $10,048,075, against $11,813,300 a week ago. The following is a comparison of the averages for the last two weeks:

	Sept. 15.	Sept. 22.	Differences.
Loans	$243,795,000	$243,976,400 Inc.	$181,400
Specie	19,913,000	19,274,700 Dec.	638,300
Legal t'nd'rs	44,045,900	42,454,400 Dec.	1,591,500
Deposits	208,582,400	206,724,100 Dec.	1,858,300
Circulation	15,577,100	15,596,100 Inc.	19,000

The following tables show the movements in foreign trade for the week:

IMPORTS.

For week ended Sept. 22:

	1875.	1876.	1877.
Total for week.	$6,292,249	$6,365,551	$6,400,133
Prev. reported.	251,620,387	209,005,477	237,801,924
Since Jan. 1	$257,012,636	$215,371,028	$244,202,057

Included in the imports of general merchandise were articles valued as follows:

	Quantity.	Value.
Brass goods	8	$1,791
Bronzes	29	8,371
Chains and Anchors	3	253
Copper		2,912
Cutlery	106	29,556
Guns	31	6,219
Hardware	1	246
Iron, pig, tons	300	5,840
Iron, sheet, tons	3	131
Iron, other, tons	201	7,744
Lead, pigs	1,878	9,697
Metal goods	138	11,847
Needles	28	11,451
Platina	1	4,419
Per. caps	21	3,149
Saddlery	3	515
Steel	244	7,696
Silverware	4	459
Tin, bxs	18,083	97,282
Tin, 2,399 slabs	192,003	30,673
Wire	28	3,063
Zinc	27,711	1,429

EXPORTS, EXCLUSIVE OF SPECIE.

For week ended Sept. 25:

	1875.	1876.	1877.
For the week	$4,100,204	$5,550,475	$7,427,911
Prev. reported.	181,909,202	192,029,194	202,303,410
Since Jan. 1	$186,009,496	$197,579,669	$200,731,321

EXPORTS OF SPECIE.

For week ended Sept. 22:

Total for the week	$221,911
Previously reported	22,431,446
Total since Jan. 1, 1877	$22,653,357
Same time in 1876	40,448,900
Same time in 1875	64,873,174
Same time in 1874	44,404,045
Same time in 1873	41,387,331
Same time in 1872	57,658,178

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. Currency 6's	121	122
U. S. 6's 1881 registered	109½	109¾
U. S. 6's 1881 coupon	110⅝	110¾
U. S. 6's 1865 new reg	105⅝	105⅝
U. S. 6's 1865 cou	105⅝	105⅝
U. S. 6's 1867 reg	107¼	107⅜
U. S. 6's 1867 cou	107⅜	107½
U. S. 6's 1868 reg	109¼	109¾
U. S. 6's 1868 cou	109½	109¾
U. S. 10-40 reg	107	107⅛
U. S. 10-40 coupon	108	108½
U. S. 5s 1881 registered	107⅛	107¼
U. S. 5s 1881 coupon	107¼	107⅜
U. S. 4½s 1891 registered	105¼	105½
U. S. 4½s 1891 coupon	105¼	105½
U. S. 4s 1907 registered	101⅝	101¾

The following were the closing quotations of shares on the active list:

	Bid.	Asked.
Chicago and Northwest	37⅝	37¾
" " Pref	63⅛	63⅜
Chicago, Rock Island and Pacific	101⅝	101⅞
Chicago, Bur. and Quincy	101¼	102
Col., Chic. and Ind. Cent	3⅝	3⅞
Clev., Col., Cin. and Ind	38	39
Cleveland and Pittsburgh	82½	83¼
Chicago and Alton	84½	85½
" " Pref	103	..
Consolidation Coal	22	..
Canton	20	25
Delaware, Lack. and Western	47½	47⅝
Delaware and Hudson	43	43½
Express—Adams	95	96½
" American	52½	53
" United States	47	48
" Wells, Fargo & Co	83	84
Erie	10¾	10⅞
Harlem	141	142½
Hannibal and St. Joseph	12	12½
" " Pref	26¾	27
Illinois Central	70¾	71
Kansas Pacific	..	3½
Kansas and Texas	6⅛	6⅜
Lake Shore	63⅝	63¾
Michigan Central	58⅝	58¾
Morris and Essex	74	74¼
Milwaukee and St. Paul	36⅜	36½
" " Pref	72¼	72½
Mariposa	1	1¾
" Pref	1½	2
New York Central	100⅞	101⅛
New Jersey Central	17	17¼
New Jersey Southern	½	¾
Ohio and Mississippi	7	7⅛
" " Pref	13⅞	14⅛
Pacific Mail	22¼	22⅜
Panama	112	..
Pittsburgh and Fort Wayne	91¾	92
Quicksilver	20½	21
" Pref	35½	36
St. Louis Kansas City Northern	5⅜	5¾
" " " Pref	26¾	27
Toledo, Wabash and Western	12½	13
Union Pacific	67	67⅜
Western Union Telegraph	78⅛	78⅜

MINING STOCKS.

Mr. Ogden Haight, No. 65 Wall street, sends us the following report of the business of the New York Mining Stock Exchange for the week ending Sept. 26:

	Closing Quotations, in Currency.	Shares Sold.
Alpha	15.00	100
American Flag	.10	3,200
Belcher	6.62½	....
Bertha & Edith	.31	35,200
Best & Belcher	20.75	....
Bullion	8.62½	500
Bobtail	2.62½	50
Caledonia	4.25	300
California	31.50	....
Chollar Potosi	35.75	....
Cleveland	6.50	500
Consolidated Virginia	34.62½	....
Confidence	5.25	200
Crown Point	5.00	200
Eureka	47.25	500
Exchequer	9.25	100
Gould & Curry	9.75	....
Hale & Norcross	7.37½	....
Hukill	3.12½	200
Julia Consolidated	2.87½	500
Justice	18.87½	400
Kentuck	6.62½	600
Lacrosse	.31	11,900
Leopard	1.87½	1,300
Mexican	11.00	800
Moose	5.50	19,300
Northern Belle	20.25	500
Ophir	17.62½	500
Overman	26.25	400
Raymond & Ely	14.50	....
Savage	8.37½	400
Seaton	.83	1,800
Segregated Belcher	41.00	....
Sierra Nevada	5.00	....
Union Consolidated	6.30	....
Yellow Jacket	11.00	300

The most important feature of the market during the week has been the rapid decline of Bertha and Edith from 95c. on Thursday to 60c. on Saturday, and from this to 30c. on Monday. The company accounts for this by the issue of large amounts of stock to holders of old Edith or Bertha stock. The present company was formed by the consolidation of these two. In this connection attention is called to our note of last week relative to this stock. The sales aggregated 35,200 shares. Moose opened at 5¾ but declined to ¾, with final sales at ½. Persons of good judgment who are familiar with the mine say that the stock is now selling at its full value; over 19,000 shares were sold. Lacrosse is growing more popular, 12,000 shares having changed hands. We are inclined to credit the genuineness of these transactions. American Flag is also a growing favorite, over 2,000 shares having been sold on Saturday last at 10c. @ 11c. It is rumored that transfer offices for most of the California mining stocks will be established here in New York in less than sixty days.

GENERAL HARDWARE.

The improvement in general business which set in with the opening of the fall season has not been of a spasmodic character, but on the contrary seems to gain in volume steadily with the advancing season. The tone of the market, except in the case of a few lines of goods which have been irregular for some time, and which it is unnecessary to particularize, is strong. There are very few buyers in the city, but travelers' memorandums are well filled and mail orders abundant.

In Foreign Hardware there is a good business doing, especially in shelf goods. In fine and medium Table Knives, we hear of a better demand for Ivory goods of such well-known brands as Joseph Rodgers & Sons and Harrison Bros. & Howson than this market has been favored with since 1872. From other business centers the reports regarding trade are uniformly good.

The demand for Nails is reported active, and during the week there has been considerable inquiry for large lots. We hear of a sale of 5000 kegs (Western brand) on private terms. We continue to quote 10d. to 60d., $2.50, net, with an allowance of 10 cents per keg on lots of 200 kegs and over. In our last issue we referred to the letter of our Pittsburgh correspondent, announcing a break in the price of Nails at Wheeling, and the issuing of a $2.15 card, as this statement was slightly incorrect as regards the new card, we print below the circular of the Riverside Iron Works, to which reference was made in the correspondence referred to.

WHEELING, Sept. 10, 1877.

DEAR SIR: We beg leave to quote you Riverside Nails at $2.25, card rates, with an abatement of 10 cents per keg on orders of 200 kegs or over. Usual terms.

In quoting this very low price, we desire to call the attention of our customers and the trade generally to the fact that, notwithstanding the low and unremunerative prices now ruling, we are endeavoring to keep our goods up to the high degree of excellence by which they have been heretofore characterized. We use no old rails nor inferior brands of pig iron. Our goods are all made from pig iron produced at our own blast furnace, from the best grades of Lake Superior and Missouri ores, and we are thus enabled, at all times, to obtain a uniform quality. Our Nails secured the highest award at the late Exposition, and are now well and favorably known; they are carefully picked by hand and sifted to free them from dust, and notwithstanding the claims put forward by those using machine pickers, we confidently assert that our packages contain less dirt and fewer imperfect Nails than any in the market from mills using the machine pickers. Respectfully soliciting your orders, we are, yours truly,

RIVERSIDE IRON WORKS.

Our reports from Pittsburgh, dated yesterday, show no change in the situation, and Pittsburgh mills were, in self-defense, obliged to meet the Wheeling card. The disturbed condition of the Nail market in the West has little or no effect here, and makers are very firm in their views at our quotations, with no disposition to book orders for future delivery at ruling rates.

The Stanley Works, New Britain, Conn., and No. 79 Chambers street, New York, have this day made the following changes in their discount sheet of June 1, 1877. Their revised discount sheet will be issued shortly:

Catalogue pages.	Discount per cent. Sept. 26, '77. New Price.	Old Price.
Supp't, Bronzed Loose Joint Butts, with Acorns	20	10
Supp't, Bronzed Loose Joint Butts, no Acorns	20	15
8 to 12, Bronzed Narrow Butts, &c.	40	20
8, Bronzed Light " "	40	30
11, " " Inside Blind Butts	40	30
6 and 7, Bronzed Parliament "	40	20
13 to 15, " Flush Bolts	40	20
16 and 17, Butts, with Acorns and Fric. Roller	List Cast Butts.	
18 to 21, Butts, Loose Joint, with Japanned, Bronzed or Silvered Acorns	62½&10	55&10
Supp't, Butts, Loose Joint, ditto		
23, Butts, Jap'd. Loose Joint, without Acorns		
Supp't, Butts, Loose Pin, with Silvered Acorns		
24 to 27, Butts, Parliament	40	20&10
Japanned Screws, American Screw Co.'s, list of Dec. 1, 1875	40&10	35

E. Ketcham & Co., Nos. 100 Beekman and 289 Pearl streets, have issued the following discount sheet and memorandum of changes in list, prices to apply to their illustrated catalogue and price list of May, 1877. We have received a copy of the catalogue referred to, which is one of the most carefully arranged and fully illustrated books of the kind that has come to our notice. Ten pages are devoted to Planished Ware; eight pages to Deep Stamped Ware; eight pages to Common Stamped Ware; nine pages to Tinners' Trimmings; seventeen pages to Japanned Ware; twelve pages to Plain Tinware; thirteen pages to Iron Goods and the balance of the book to Wire Goods, Miscellaneous Goods and Tinners' Tools and Machines. The book contains 128 pages, and the illustrations, paper and press-work, are all of the first-class. Some idea may be had of the comprehensive manner in which it is illustrated when we say that there are about 600 cuts scattered throughout the book; it is neatly bound in cloth. Among the changes in list prices in the accompanying sheet we notice a very important reduction in the price of their Patent Metal Rimmed Flour Sieves. This Sieve is constructed of a single sheet of metal, and is made from 14, 16, 18, 20, 24 or 30 mesh cloth, both iron and plated; they are neatly packed, one dozen in a box, and will compare favorably with any similar line of goods on the market. In their advertisement on page 19, they show a fine illustration of this Sieve.

Office of E. KETCHAM & Co.,
100 Beekman and 289 Pearl sts., New York.

DEAR SIR: The discounts on prices named in our illustrated catalogue of May, 1877, are as follows:

Planished Ware, pp. 7—16	35 %
Deep Stamped Ware, pp. 17—24	45 %
Common Stamped Ware, pp. 25—32	35 %
Japanned Ware, pp. 42—58	25 %
Pieced Tin Ware, pp. 59—75	40 %
Machines, pp. 105—110	10%
Tools, pp, 111—121	20 %

Subject to change without notice.

The terms on our bills are 60 days. One per cent. deduction for cash in 30 days or two per cent. for 10 days. If not paid in 60 days, we make sight draft, giving ample notice. Should a draft, for any reason, be unacceptable, a check sent us upon receipt of notice will intercept the same.

The following are some recent changes:

Page 17.—Add 5 qt. Pans; Plain, $2.85 per dozen; Retinned, $3.50 per dozen.
Page 20.—List on Scoops, Nos. 2, 3, 4 and 5 altered to $4.00, $4.50, $5.50 and $7.50 respectively.
Page 26.—List on 1c Japanned Dust Pans changed to, per gross $19.00
1x Plain or Japanned Dust Pans changed to, per gross $21.00
Page 34.—Discount on Dampers, both kinds, increased to ..... 33⅓ %
Page 35.—Discount on Flat Stove Boards ..... 45 %
List on Patent Wood-Lined Stove Boards reduced $6.00 per dozen, making them now $18.00, $21.00, $24.00 and $27.00 respectively. Discount as before.
Page 37.—List on Adjustable Elbows altered as follows: 4-inch Charcoal, $2.00; 4½-inch Charcoal, $2.50 per dozen.
List on Corrugated Elbows, same as the Adjustable, and discount ..... 20 %
Page 71.—Seamless Dripping Pans, on account of the present low rate of iron, 9c. per pound. The Oblong Seamless Pans will soon be ready. No. 1 (10x13 in.); No. 2 (11x14 in.); No. 3 (12x16 in.); No. 4 (13x18 in.).
Add No. 0 Fry Pans, list ..... per doz., $3.00
Page 75.—We give the following low rates on Coal Hods:

Inch	14	15	16	17	18
Black Japanned, per doz.	$2.80	3.20	3.50	4.00	4.40
Galvanized, "	4.20	4.60	5.20	6.00	7.50

These Hods are the old, original sizes, having a larger capacity than those usually sold.

Funnel Coal Hods for Self-Feeding Stoves:

	Small, 19 inch.	Large, 20¼ inch.
Black Japanned,		Dozen.
Filleted "		Dozen.
Galvanized,		Dozen.

Prices on Coal Hods net.

Page 84.—Patent Metal-Rimmed Flour Sieves have been reduced. List now is:

Mesh	14	16	18	20	24	30
Iron Cloth, per doz.	$3.00	3.00	3.25	3.50	4.00	5.50
Plated per doz	3.75	4.00	4.25	4.50	5.00	7.50

Discount 33⅓ %.

These are handsomely made of one piece, without seams, solder or rough ends to injure the hands in sifting.

Page 101.—Tubular Lanterns:
No. 0, without Guards ..... per doz., net, $10.00
No. 0, with " " " 10.50
Page 102.—Catch-'em-Alive Traps ..... list, 4.00
Pages 112 and 114.—Squaring Shears and Wood Roofing Folders, now classed as "Machines."

We add to our assortment a new article called "Perfection" Stove Pipe, for which we are New York agents. A much-desired improvement will be found in this Pipe, as every joint is of precisely the same size, and can be put up by an unskilled person just as well as by a trained mechanic. The advantage in storage is a great item, several hundred lengths occupying a space of only a few square feet. Can be shipped as fourth-class freight. Sold only in crates of 50 each.

Prices.

Inches	5	6	7
Charcoal Iron	12	13	15 cts. per length of 24 in.

The Charles Parker Co., of Meriden, Conn., have issued the following circular, under date of 15th instant:

MERIDEN, CONN., Sept. 15, 1877.

To the Wholesale Trade: From this date, and until further notice, the prices of our Capped Pivot Blind Hinges and Fastenings will be as follows:

For Wood Buildings.

Per doz. sets.
No. 1 Throws the Blind 1 inch from the Casing $3.50
No. 2 Throws the Blind 1½ inches from the Casing 3.75
No. 3 Throws, the Blind 2 inches from the Casing 4.00
No. 4 Throws the Blind 2½ inches from the Casing 4.25
No. 20 For Blinds that set outside the Casing. 3.50
In cases of six dozen.

For Brick Buildings.

Per doz. sets.
No. 5 Throws the Blind 3 inches from the Casing $4.75
No. 6 Throws the Blind 3½ inches from the Casing 5.00
No. 7 Throws the Blind 4 inches from the Casing 5.75
No. 8 Throws the Blind 4½ inches from the Casing 6.50
No. 25 For Blinds that set outside the Casing. 4.75
In cases of four dozen.

Per doz. sets.
No. 9 Throws the Blind 5 inches from the Casing $7.50
No. 10 Throws the Blind 5½ inches from the Casing 8.50
No. 11 Throws the Blind 6 inches from the Casing 9.75
No. 12 Throws the Blind 6½ inches from the Casing 11.50
No. 13 Throws the Blind 7 inches from the Casing 12.00
No. 14 Throws the Blind 7½ inches from the Casing 12.50
No. 15 Throws the Blind 8 inches from the Casing 13.00
In cases of three dozen.

Less 60 and 10 per cent. discount, Cash within 30 days.

THE CHARLES PARKER CO.

Graham & Haines, No. 113 Chambers street, have been appointed sole agents for F. K. Sibley's Emery and Crocus Cloth. They quote the same to regular trade at the following net prices:

SIZES OF SHEETS AND PRICE LIST.

Large Sheets, 9x12 in., all numbers, per ream.	$20.00
Medium " 7x9 " " "	12.50
By the yard, 27x36 " " per yard	.40
In rolls of 8 yards, 3½ in. wide, all numbers, per roll	.40

Numbers of Emory, 60, 70, 80, 90, 100, 120, F, FF, and Crocus.

We invite attention to the advertisement of the Thurston Knob Screw Co., of Marlboro, N. H., which will be found on the 22d page. They make a specialty of the manufacture of Double Gimlet Pointed Knob Screws; Enameled Jet, Thread Case and Shutter Knobs with fast Screws; Base Knobs, Furniture Fenders; Black Walnut Hat and Closet Pins, Drawer and Picture Knobs and kindred goods. Fernald & Sise, No. 100 Chambers street, are their agents in this city and carry a full assortment of the above-named goods in stock, which they offer to the trade at factory prices.

The Penfield Block Works, Lockport, N. Y., illustrate in their advertisement on page 13, their new styles of Wrought Iron Gin Blocks. These goods, we are informed, give entire satisfaction wherever introduced, and supply a long-felt want for a strong Block with an extra strong bushing in the sheave. Henry B. Newhall, No. 11 Warren street, is agent for these goods in this city.

Sidney Shepard & Co., Buffalo, N. Y., invite the attention of the trade to their assortment of "Palace" Coal Vases. These goods are illustrated in their advertisement on page 35.

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, Sept. 26, 1877.

Scotch Pig.—The market is quiet, with a fair business doing. Prices are steady. The following are makers' quotations:

Coltness No. 1	67/
Glengarnock No. 1	60/
Eglinton No. 1	55/6

Manufactured Iron and **Rails** are quiet, with nothing of note to report.

IRON.

American Pig.—There is more life to the market this week than we have been able to report in a long time. A good many sales have been made of small parcels for prompt delivery, and the inquiry from small foundries, many of which have been idle for some time, is becoming active and general. During the week sales are reported of 7000 tons different brands on private terms, also 700 tons Allentown, and 500 tons of a brand, the name of which we did not learn, both on terms which have not transpired. These are independent of the small parcels referred to above, which will aggregate 600 to 800 tons more. The tone of the market is generally reported strong. We quote: Foundry No. 1, $18 @ $19; Foundry No. 2, $17 @ $18; Gray Forge, $16 @ $17.

Scotch Pig.—During the week 300 tons of Scotch Iron arrived at this port, part of which was sold previous to arrival. The only sale from store that we hear of is 50 tons Glengarnock at $25.50. We continue to quote: Glengarnock, $25 @ $25.50; Eglinton, $24 @ $24.50; and Coltness, $26.50 @ $27.

Rails.—Sales are reported of 500 tons Steel Rails, delivered here at $45, and 1800 tons for a Southern road, said to be at a very low price. In Iron Rails we do not hear of any transactions. We quote Steel, $42 @ $45, and Iron, $33 @ $37, both at mill.

Old Rails.—In the absence of transactions we continue to quote $19 nominally.

Scrap.—Since our last, 500 tons No. 1 Wrought changed hands on private terms. We quote the same from yard, $22 @ $23.

Manufactured Iron.—The gloom which has hung so long over this branch of the Iron trade has given way to a better feeling, caused in a great measure by some heavy transactions both present and prospective. Among the latter is the contract for about three miles of single and six miles of double track for the New York Elevated Railroad Company, which will be closed on the 2d proximo, and which will require from 10,000 to 15,000 tons. During the week the contract for a small bridge at Yonkers was awarded to A. R. Whitney & Bro., of this city, requiring about 100 tons. A portion of the new armory for the Seventh Regiment has also been contracted for and a contract has been awarded for a portion of the Capitol at Albany requiring over 500 tons. We hear also of inquiries from Brazil for Iron for building purposes, and to-day a small lot of Iron for Costa Rica was sold. In this connection we would say, that it is the general belief that a large trade in Iron and manufactures thereof with South American countries, particularly Brazil, would fall to our lot if some enterprising capitalists would undertake to run a line of steamships from this port direct—as it is, we are informed of a case where Iron was shipped from this country to England, re-shipped to Brazil, and laid down there at a price lower than English makers can furnish the same grade. In Merchant Bars there is little doing, and prices for all kinds are unchanged. We quote Common Iron, ordinary sizes, 1.8c. @ 1.9c., and Refined, 2c. @ 2.1c. from store. For large lots these figures could be shaded a trifle.

METALS.

Copper.—Sales for the week have been limited to 200,000 pounds Lake Superior, on the spot, at 18½c., which is also the closing figure. Baltimore we quote 18½c. The statistical position of Copper in this country seems to us quite a favorable one if anything. We have shipped thus far 8,000,000 pounds Lake; 5,000,000 pounds more will follow, and there will probably be used for cartridges in this country something like 7,000,000 pounds, together 20,000,000 pounds Lake Copper. We estimate this year's Lake production at 36,000,000 pounds, and deducting therefrom the above 20,000,000 pounds, there would be left for consumption among us during the 12 months a balance of 16,000,000 pounds. Until lately, it is true, consumption in the United States had decreased considerably this year, but during the past month or two this has undergone a favorable change, and we are inclined to think that, altogether aside from other sorts of Copper, it will not be a difficult matter to absorb the 16,000,000 pounds of Lake Copper above alluded to this year, leaving us at its close with a stock not much larger than at the commencement of the year. There are now but a couple of months left, and lake navigation will be closed, and unless prices greatly improve, there will then be little inducement for the mines, especially those barely covering cost, to ship any Copper this way by rail. In Europe on the other hand, the outlook is anything but encouraging. The imports of ore into England from all quarters have been large, summing up for the eight months of this year 71,596 tons, against 47,161 in 1876, and 34,455 in 1875; of Regulus, 24,741 tons, against 22,008 and 23,129, and of Wrought and Unwrought Copper, 28,944, against 25,438 and 28,353. Best Selected, according to the latest cablegram received from London, had given way 10/ to £74, and Chili Bars, £1 to £66. The manufactures of Copper and Yellow Metal are in steady, moderate request at the prices previously ruling; we quote New Sheathing Copper, 28c., and Bolts and Braziers, 30c.; Yellow Metal Sheathing, 20c.; Yellow Metal Bolts, 25c., and Nails, 20c., net cash.

Tin.—The market has continued active, not to say buoyant. The demand is mostly for consumption, but in part, we presume, speculative, the latter based principally on the reduced available supply and the comparatively little now actually afloat for New York and Boston. It is, in other words, a movement of a more exclusively local nature, and has come in a measure spontaneously, as a sort of healthy reaction from too continuous a decline. If, at present low prices the consumption of Tin increases materially in America, it would be an important circumstance and go a great way toward neutralizing the bad effect which the excessive Australian and Tasmanian production has exercised here and in Europe. In China, we mentioned the other day, something similar is occurring. Consumption suddenly assumes unexpectedly large proportions, possibly because the cheapness of the metal begins to displace other kinds of material. We quote, in large lots, in gold: Straits, Australian and Malacca, 15¾c. @ 16c.; English Refined, 15¼c. @ 15½c.; do. Common, 15c. @ 15¼c., and Banca 17½c. @ $17¾c., all gold. London is (per cable) unaltered at £65 for Straits; Singapore (per cable) has advanced to $19.75 per picul. *Tin Plates*—A fair jobbing trade is doing, and the expectations as to business in this article during the ensuing couple of months are more sanguine than otherwise. In England the market is dull, and prices so low that there is no profit in manufacturing. Makers are, consequently, watching our own market with fresh interest, and are in strong hopes that a considerably increased American consumption may pave the way for the advent of more prosperous times. We quote at the close, gold, per box, large lines, ordinary brands: Charcoal Bright, $6.62½ @ $6.75; do. Ternes, $6.12½; Coke Tin, $5.75, and do. Ternes $5.37½ @ $5.62½.

Lead.—The same listlessness which has characterized our Lead market for some time past continues unbroken, and the sales have been but trifling at the uniform price of 4¾c., currency, indiscriminately for Common Domestic and Soft Missouri. In foreign there is no change, the late advance in London, given in our last report, having made no further headway. Now that there is no cause for hurrying shipments in Spain on account of the export duty, it is to be presumed prices will continue to gradually appreciate in the north of Europe as well as at Marseilles. The English import during the first eight months has been 63,482 tons against 52,134 and 52,240 in 1876 and 1875, and the export, 28,237, against 24,277 and 22,779. By mail we have the following from England, dated Sept. 15: "Low prices have checked imports of Spanish, and this causing somewhat of a run on English, lots for prompt delivery are somewhat hard to get, and a slight advance has to be paid. We quote English Pig, £20. 2/ to £20. 10/, and Sheet, £21. /5. Manufactured is in fair demand at unchanged prices; we quote Bar, 7c.; Pipe, 7½c.; Sheet, 8; and Tin-lined Lead Pipe, 15c.—all less 10 per cent. to the trade.

Spelter and Zinc remain inactive at 5⅞c. to 6¼c., currency, for Domestic, and nominally 6¼c., gold, for Silesian. Accounts by mail from Germany just to hand, advise no further alteration. *Sheet Zinc.*—Sheet is very quiet, but prices are unchanged. We quote Mosselmann 8c. @ 8½c., gold, and Domestic 7⅜c. @ 7½c., currency.

Nickel.—The demand is steady, and prices are fully sustained. We therefore repeat our previous quotations of $1.70 @ $1.85, gold, per pound.

Antimony.—As was to be foreseen, the extreme scarcity of the available metal and the little on the way, finally resulted in an advance to 13c., gold, at which there is a steady inquiry. London reports no further change.

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending Sept. 25, 1877:

	Quan.	Value.
Hamburg.		
Belting, cs.....	18	$6,337
Sand paper, cs	8	362
Spelter, slabs.	3838	12,300
Copper, bbls.	90	22,500
Mf. iron, pkgs	23	240
W'shades, bxs	9	340
Ag. imp., pkgs	2	110
Lamps, cs....	2	75
Clocks, cs.....	435	9,554
Mach'y, cs....	16	1,771
Brassware, cs	4	889
Hdw., pkgs...	129	2,736
Tinware, pkgs	14	540
Sew. mach., cs	31	1,229
Bremen.		
Hdw., pkgs...	27	260
Mf. iron, pkgs.	19	515
Mach'y, pkgs	8	100
S'dpaper, bdls	15	130
Sew. mach., cs	110	4,200
Ag. imp., cs...	4	295
Clocks, cs.....	1	76
Wringers, cs..	6	150
Pumps, pkgs..	11	800
Antwerp.		
Mach'y, cs....	1	1,351
Liverpool.		
Hdw., cs.....	175	4,309
Mach'y, pkgs.	174	3,912
Clocks, bxs...	69	3,007
Metal g'ds, cs.	8	630
L'p goods., cs.	61	1,776
Wringers, cs..	22	514
London.		
Clocks, bxs...	36	1,900
Mch'y, pkgs..	311	14,793
Hdw., cs	254	6,010
Ag. Imp., pgs.	12	790
Belting, cs....	3	869
Sew. mach., cs	240	8,090
Pl't'd ware, cs.	20	2,287
Spelt'r, slabs.	1472	4,550
Lamps, bxs....	25	1,518
Rifles, cs.....	49	1,840
Copper, bbls..	135	33,750
Mf. iron, pkgs.	6	192
Pumps, pkgs.	14	540
Wringers, cs..	11	500
C'ge mtls., pgs	64	2,000
Canada.		
Screws, cask..	1	62
British North American Colonies.		
Coal, tons.....	60	210
Mf. iron, pkgs.	113	1,194
Tel. matl, pgs.	15	901
Mach'y, pkgs.	14	1,200
Hdw., pkgs...	55	1,400
Iron safe.....	1	50
Spikes, kegs..	20	100
British West Indies.		
Ag. imp., pgs.	8	70
Nails, kegs....	17	55
Lamps, pkgs..	11	108
Brazil.		
Pumps, pkgs..	19	762
Hdw., pkgs....	59	715
Ag. Imp., pgs.	60	1,553
Tinw're, pkgs.	5	79
Clocks, cs.....	101	1,025
Irons, bxs.....	260	1,555
Hayti.		
Mf. iron, pkgs.	8	309
Hdw., cs.....	59	1,210
Lamps, pkgs..	9	142
Nails, kegs....	44	196
Scales.....	1	250
Spikes, kegs..	15	40
Cartridges, cs.	15	427
Guns, cs.....	6	990
Revolvers, cs..	1	72
Mach'y, pkgs.	11	656
Safe	1	125
Cutlery, pgs...	18	405
Sew. mach., cs	6	123
Porto Rico.		
Nails, kegs...	65	$199
Mach'y, pkgs.	50	437
Hdw., pkgs...	14	492
Safe	1	225
Scales.....	1	75
Cisplatine Republic.		
Car wheels....	20	150
Pumps, pkg...	1	91
Lamps, pkgs..	20	410
Hdw., pkgs...	46	1,187
Car.....	1	857
Pl't'd w're, cs.	1	70
Ag. imp., cs...	31	688
Clocks, cs.....	6	149
Japan.		
Mf. iron, pkgs	6	374
La'p g'ds, pgs	13	325
Nails, kegs....	435	1,316
Hdw., pkgs...	27	256
Coal, tons	100	357
Mach'y., bxs...	2	120
Clocks, cs.....	51	279
Brass g'ds, pgs	12	520
Glasgow.		
Hdw., cs.....	6	65
Pl't'd ware, cs.	1	170
Lamps, cs....	3	88
Havre.		
Mach'y., cs....	1	200
Ag. imp., cs..	11	800
Copper, cks...	223	35,750
Marseilles.		
C'ge mat. bxs.	11	532
Cuba.		
Sew. mach., cs	57	1,691
Files.....	100	50
Mf. iron, pkgs.	189	913
R.R. mt'l. pgs.	534	3,036
Grindstones...	356	449
L'p g'ds, pkgs.	14	389
Hdw., pkgs...	205	3,982
Bellows.....	20	204
Brassware, cs.	2	301
Ag. imp., pgs.	28	409
Tinware, cs..	18	315
Mach'y, pkgs.	474	109,842
Nails, kegs....	445	1,004
Meters, pkgs..	7	815
Clocks, bxs..	4	117
Lisbon.		
Clocks, cs.....	13	150
Scales, cs.....	17	385
Genoa.		
Ag. imp., pgs.	6	45
Venezuela.		
Hdw., cs.....	90	1,498
Pumps, pkgs.	3	140
Lamps, pkgs.	10	173
Cutlery, cs....	8	425
Ag. imp., pgs.	29	380
Pl't'd w're, pgs	3	493
Sew. mach., cs	13	285
Machy., pkgs.	31	664
Tinware, cs..	5	157
Central America.		
Nails, kegs....	66	179
Mf. iron, pkgs.	16	160
Cutlery, pkgs.	6	157
Hdw., cs.....	20	645
Tinware, cs...	6	118
Shot, pkgs....	13	115
Powder, pkgs.	24	81
Argentine Republic.		
Tinware, pkgs	14	198
Well wh'ls, pgs	52	143
Mexico.		
Shoe nails, cs.	48	980
Iron, pkgs....	64	300
Nails, kegs....	41	119

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Sept. 25, 1877:

Hardware.

Binsee L. B. & Co.
Cases, 2
Boker Hermann & Co.
Cutlery, cs., 18; cks. 3
Hardware, cs., 20
Brown William,
Grindstones, 50
Degraw Aymer & Co.
Chains, 3; cks., 9; bxs., 1
Drexel, Morgan & Co.
Cases, 2
Dale John G.
Grindstones, 10
King, Briggs & Co.
Packages, 3
Per. caps, cs., 1
Livingston W. & F.
Grindstones, 792
McCoy & Co.
Chains, cks., 7
Mdse., pkgs. 2
Richardson Bros.
Saws, cs., 4
Schoverling & Daly,
Mdse., pkgs., 4
Spies, Kissam & Co.
Guns, cs., 5
Ward Asline,
Cutlery, cs., 1
Cases, 5
Casks, 1
Wiebusch & Hilger
Hdw. Co.
Anvils, 260
Hdw. & Cut. pkgs., 19
Order,
Casks, 3
Per. caps, cs., 6
Wads, cs., 7
Packages, 14
Files, cks., 4
Wire, bdls., 4
Guns, cs., 2

Iron.

Gossler & Co.
Round bdls., 136
Bars, 1617
Henderson Bros.
Pig, tons, 300
Hopkins E. S.
Ore, bxs., 1
Middleton & Co.
Scrap, tons, 2
Mitander Nils,
Bars, 362
Bundles, 6
Naylor & Co.
Bars, 1120
Tucker & David,
Sheet, cs., 3

Steel.

Brown William,
Packages, 76
Wire, bdls., 16
Benedict E.
Cases, 8
Carey & Moen,
Wire, bdls., 321
Prosser Thos. & Sons,
Steelware, pkgs., 34
Sanderson G.
Boxes, 1
Casks, 38
Sulzbacher, Hyman & Wolffe,
Packages, 15
Woodford W. O.
Cases, 5
Bundles, 45
Wire, bdls., 262

Metals.

Beare & Sons,
Tin plates, bxs., 150
Byrne Joseph & Co.
Tin plates, bxs., 1702
Bruce & Cook,
Tin plates, bxs., 442
Cort N. L. & Co.
Tin plates, bxs., 1632
Hurst F. W. J.
Tin slabs, 2
Jex William & Co.
Scrap copper and brass, pkgs. 5; cs. 1
Kidder, Peabody & Co.
Tin slabs, 520
McCoy & Co.
Nickel, cs., 2
Naylor & Co.
Tin plates, bxs., 1184
Phelps, Dodge & Co.
Tin plates, bxs., 9665
Pratt C. & Co.
Tin plates, bxs., 1120
Scheider Jos. & Co.
Tin plates, bxs., 579
Societe de Credit Suisse,
Tin slabs, 746
Sanders Bros.
Tin, ingots, 160
Wheeler E. S. & Co.
Lead, pigs, 1500
Order,
Tin plates, bxs., 5650
Lead, pigs, 200
Tin slabs, 462
Without Bills of Lading
Tin, ingots, 26
Antimony, cks., 4

COAL.

In spite of the strike and the efforts of the trade to frighten purchasers, the market has remained very quiet. One of the largest companies in the city which has some coal to sell, finds it "impossible to find a price" at which they can get rid of their coal. Quotations, while remaining at the same figures as were given a week since, are merely nominal, and in order to secure custom concessions have to be made. In fact the figures are nominal. Very few people want coal, stocks being large in all directions; even in Western and Central New York, where it was supposed coal was not plenty, it appears that there is sufficient to meet all immediate wants. The Philadelphia and Reading Company are reported to be sending large quantities of coal West and North, and it appears that the facilities for distribution in those directions are rapidly increasing. Reports from the mines yesterday say that Mr. Parrish has made terms with the men and that they have virtually gone to work. The effect of this action upon other regions is uncertain. The men of the Pennsylvania Coal Co. and several other companies and individual miners held meetings yesterday to discuss the situation, but the results of these meetings were not known at the time of going to press. The men who have gone to work are practically upon a "basis," and if with an increase of production there is a fall in the price, they will be in the same condition as at present. Comparing this year with last, the production is already some 2,000,000 tons in excess—the figures show 2,800,000 tons. With the present condition of trade and exports it is hardly reasonable to suppose that any considerable portion of this has been consumed. In view of this fact, it is reasonable to suppose that, in the event of any general resumption, prices can hardly be sustained, even during the brisk demand in the fall. People generally can wait, even when navigation closes, for two reasons: there is Coal on hand, and it is perfectly easy to obtain all the Coal required in almost any part of the country by rail, even in mid-winter. Experienced men in the trade think that a few auction sales would cause considerable reaction in prices, even at the present time.

OLD METALS, PAPER STOCK, &c.

We have no special feature of interest to report in the condition of this market since last week. Rags and Paper stock still continue unimproved, and prices are somewhat weaker. The call for Grass Rope is also very light. Old Metals remain unchanged from the dullness previously noted.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper	$0.13	@	$0.14 per lb.
Yellow Metal	.10	@	.... "
Brass, heavy	.09½	@	.... "
Brass, light	.08½	@	.... "
Composition, heavy	.11½	@	.... "
Lead, solid	.04	@	.... "
Tea Lead	.03½	@	.... "
Zinc	.03½	@	.... "
Pewter, No. 1	.11	@	.... "
Pewter, No. 2	.07	@	.... "
Spelter	.05½	@	.... "
Wrought Iron	17.00	@	.... pr ton.
Light do	12.00	@	.... "
Stove Plate	9.00	@	.... "
Machinery do	12.00	@	.... "
Burned Iron	4.00	@	.... "

The prices current for Rags, &c., are as follows:

Canvas, Linen	4½c.	@	5 c.
" Cotton, No. 1	5½c.	@	.
" " No. 2	2½c.	@	.
White No. 1	5 c.	@	....
" No. 2	3 c.	@	....
Colored do	2 c.	@	....
Mixed, Woolen	2 c.	@	3 c.
Soft, do	5½c.	@	6 c.
Gunny Bagging	3 c.	@	....
Jute Butts	2¾c.	@	....
Kentucky Bagging	3 c.	@	....
Book Stock	2½c.	@	....
Newspaper Stock	2 c.	@	2¼c.
Waste Paper and Scraps	1½c.	@	....
Kentucky Bale Rope	4 c.	@	....
Cakum Junk, No. 1	4½c.	@	5 c.
" No. 2	3 c.	@	....
Tarred Shaking	1 c.	@	1¼c.
Grass Rope	¾ c.	@	¾c.

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, September 26, 1877.

The general condition of business shows encouraging signs of improvement, and the movement, although not so active as the average newspaper reports seem to indicate, is nevertheless satisfactory, and may gradually reach large proportions. At this season of the year a degree of activity is always expected, but it would be rather premature to say that the present movement will be a permanent one. The large manufacturing establishments have not yet been affected, nor can we report any special hardening in values in any of the leading staples. It would be safe to assert, however, that business has a very healthy appearance. Buyers are cautious in their selections, limiting their purchases to present requirements and arranging satisfactory settlements. It is quite likely, therefore, that orders will have to be duplicated at an early date, and in this way a permanent improvement be realized. The feeling of confidence is becoming more general, although the developments of the past week somewhat unsettled things for the time being. The effect was only temporary, however, and a very cheerful tone may be now noted in all departments of business.

Pig Iron.—Business continues in much the same condition as last week, with a fair demand at current rates. Buyers manifest no disposition to purchase beyond their immediate requirements, and the market seems to have settled down to a steady trade, with present ruling prices as a satisfactory basis. Some of the furnaces are sold close up, and talk about advancing prices, but it is quite certain that such a course would not be successful at present; in fact, we do not see that the market has developed any additional strength for some time past. There is sufficient demand, however, to keep prices steady, and upon this also the future must depend. Trade is well distributed, and every department seems to be buying a little, the stove trade probably taking something more than its full share. There is also a little more doing at the machine shops, particularly for cotton and woolen mill machinery. We also hear of several country mills buying Pig Iron which for months past have been using Old Rails exclusively, and if these should continue scarce it would probably have an important influence upon prices. The future is still regarded with some degree of uncertainty, for, although the immediate condition of the trade shows a moderate improvement, there is no demand for large lots reaching into the future. From this it is inferred that the present movement is the increase usual at this season of the year, and not to be regarded as an evidence of permanent improvement. Some of the most experienced men in the trade predict a severe relapse during the two last months of the year, but all agree that the evidences of improvement in other directions must eventually reach the Iron trade.

There is a more active demand to-day, and the market for the time being is quite animated; we understand that several buyers from a distance are in the city making inquiries, which, it is believed, will result in considerable business in course of a few days. The quotations of to-day are about as follows: No. 1 Foundry, $18.50 to $19; No. 2, do., $17 to $17.50; Gray Forge, $16.50 to $17. Sales of small lots are usually at the outside figures, but in large transactions for prompt cash, the lower rates more nearly represent the market. There are some very favorite brands, however, which sell freely at a dollar to a dollar and a half beyond the average quotation. White and Mottled iron is in active request at low prices; $14, cash, bid and refused for 1000 tons of Mottled. We have to note a reduction of one dollar per ton in the price of Cornwall Iron; this, we understand, is in part to enable the steel manufacturers to meet the market at the low rates now current.

Manufactured Iron.—There appears to be a better demand generally, and in some departments there is considerable activity. The Gilbert Elevated Railway of New York will require 7500 tons of finished iron, the orders for which have been divided as follows: 2500 tons to the Edgemoor Iron Co.; 2500 tons to the Phœnixville Bridge Co., and 2500 tons to the Keystone Bridge Co. There is also a considerable inquiry for Plate Iron, which may eventually lead to a large business. Shipbuilding continues moderately active, but we do not hear of any new contracts being placed, although there are rumors of important business being under consideration.

Plate and Tank Iron.—The condition of the trade is not materially changed since last week, and, as a rule, business is reported dull and inactive. There are some exceptions, however, and orders for small lots being frequent, the mills are all doing something. Prices are steady, and the indications seem to point to a larger business in the near future. Inquiries are quite numerous, and it seems probable that some important business will be the result. We quote as follows: Ship Plates, 2.37½c. to 2.50c.; Tank Iron, 2⅝c. to 2⅞c.; Shell Iron, 3c.; Flange Iron, 4c. to 4½c., and Best Bloom, 5½c. to 6c.

Sheet Iron.—The demand is moderate, but not equal to several preceding weeks, and manufacturers are less sanguine than at date of our last report. Prices in consequence have weakened somewhat, and in several instances we hear of cutting below the regular rates. The reaction may be only temporary; however, as dealers have not laid in heavy stocks, and the demand may spring up again at short notice. We quote: Refined Sheet Iron, No. 26 to 28, 3¾c.; No. 22 to 24, 3½c.; No. 16 to 21, 3¼c.; Best Bloom Sheets, No. 26 to 28, 5½c.; No. 22 to 24, 5¼c.; No. 16 to 21, 5c.; Common Red Plates, 5-16 to 18, 2⅜c. to 2½c.; Refined Plates or Blue Annealed, 5-16 to 18, 2¾c.; American R. G., 5-16 to 18, 3¼c.; Best Bloom, 5-16 to 18, 5c.; A. Patent Planished, 11c.; B. Patent Planished, 10c.; Bloom Galvanized, 40 per cent.; Refined Galvanized, 50 per cent.

Bar Iron.—There is some little improvement to note in this department of the Iron trade. Buyers are disposed to increase their orders in case manufacturers are willing to shade prices a trifle. We know of several offers being refused within the past few days at a very trifling reduction from current quotations. Manufacturers of first-class Iron have maintained their reputation for quality during a long period of depression, and it is scarcely the time to yield, now that buyers are getting tired of using a common article simply because of its low price. The disposition among buyers now is to get a good quality, although they are reluctant to pay the difference in value, but as business improves, there is little doubt quality will be more appreciated than it has been. Some of the mills are running full on specialties, and all seem to be having a little better demand than for some weeks previous. We quote: Common Iron, 1.60c to 1.75c., and Best Refined, 2c to 2.1c.

Steel Rails.—There is a fair amount of business doing, with prospects of a considerable increase in the course of next month. Sales latterly have been largely to the Western and Southern roads, the improving condition of which seems to indicate further purchases in course of a short time. We do not hear of any very large contracts being completed within the past few days, as buyers are holding off in the hope of placing their orders at the low rates accepted in one or two instances during the early part of the month, while sellers are equally unwilling to make further concessions. There is no doubt that the cost of production has been materially reduced within the past few months, but prices have declined in full proportion, and there seems to be a determination to make a stand at present quotations. It is estimated that at least 60,000 tons of Rails will have to be purchased within the next 60 days, which, in connection with the contracts still running, will keep the mills fully employed for a considerable time. We continue our last week's quotations—say, $44 to $45, delivered at tide-water, which fairly represents the market.

Iron Rails.—There is a good deal more business doing, and quite a number of sales are reported, the largest being a 1500 ton lot, 30 pound section. Several smaller lots have been placed, and with further inquiries there seems to be prospects of continued activity. Prices are somewhat irregular, varying according to terms of payment, but as a rule the sales of the week have ranged from $35 to $38, Philadelphia delivery. The outlook seems to improve, and the mills will probably get all they can do as the season advances. We continue our late quotations, say about $31 to $35 cash at mills, according to section and quality, Street Rails have been placed at about $38.

Old Rails.—The demand noted in our last has been well sustained, and the market is kept pretty well cleaned up. Sales have been chiefly at about $19. One lot of 300 tons sold at $18.60, Camden delivery; another lot of 2000 tons at $19, delivered near Harrisburg; and other lots, all at full prices. Holders are asking $19.50 to $20, but buyers being fairly supplied are not disposed to advance their bids. It seems likely that the low prices prevailing some weeks previous are not likely to be repeated, as the demand is steadily increasing, while the supply is falling off. We quote prices nominally $19.50 to $20, with buyers at $19.

Scrap Iron.—There is not much change to note, prices are well maintained and there is sufficient demand to absorb all offerings. We quote: Wrought, $22.50 to $23.50; Cast, $15 to $16.50.

Nails.—The demand continues to be quite active, and with stocks very much reduced, holders are firm at late quotations, say $2.40 to the trade, and $2.50 to consumers.

Lead is still dull and drooping, with small sales of Common at $4.75 and Refined at about $5 to $5.12½. Manufactured is steady, and Shot active at former quotations, as follows: Bar, 7c.; Pipe, 7½c.; and Sheet, 8c. Shot, Drop, 8¼c. to 9¾c.; Buck, 9¾c. to 10¾c., all less 10 per cent. to the trade.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, Sept. 25, 1877.

There is a more cheerful feeling in business circles, and it begins to look as if the backbone of the panic had in reality been broken. Reports from various points in the West are of a more encouraging character. One of our iron men just back from Chicago says that business is quite active there, and we are in hopes that the improvement in the West will soon be felt here. As an evidence that the volume of business here is increasing, nearly all the railroads centering at this point report a considerable increase in shipments recently, and as soon as river navigation is resumed general business will no doubt be improved still more, as the cost of transportation is so much less than by rail that orders for manufactured goods are frequently held back in consequence.

Pig Iron.—The general position of the market remains substantially the same as noted in our last report, with the exception of an increased demand; however, while there is more doing, the inquiry, as a rule, is still of a hand-to-mouth character, and there is no disposition on the part of buyers to depart from it unless inducements are held out in the shape of concessions in price. As a rule, holders of good Irons are refusing to make any concessions, but there are nearly always weak producers and dealers who, in consequence of financial necessities, are obliged to realize at the best price they can obtain. It is true there are not so many of these as there were a few years ago, but there are still some, hence an occasional sale of a round lot is reported on private terms, indicating a low price. However, the consumption is increasing, and as soon as the old rails on hand are worked up a still further improvement in the demand is probable, as it is likely, in view of the fact that the old rails are not panning out well, that some of the mills now using them will fall back on Pig Iron, notwithstanding the former are much cheaper, relatively, than the latter. Prices, as compared with the date of our last report, remain unchanged. Bituminous coal and coke Irons: No. 1 Foundry, $22.50, 4 mos.; No. 2 do., $21 to $21.50; Gray Forge, $18 to $21 for common cold-shorts and neutrals to best brands of red-shorts.

Manufactured Iron.—While the demand for most of the leading styles continues backward and is not what it should be at this season of the year, it is improving nevertheless, and as noted in former reports, our manufacturers generally are holding for better prices than those common a couple of months ago. True, we hear of an occasional order taken at a very low figure, but it is safe to infer that the goods put in at these cut-throat rates are not first class, but on the contrary, the product of old rails, or the poorest kind and quality of pig iron. Both jobbers and consumers are realizing the fact that it don't pay to handle this poor quality of Iron; that it don't answer the purpose like first quality; hence the inquiry for the latter is increasing, while that for the former is falling off, and this accounts for the fact that better prices are being realized. The demand for Sheet is not up to what it should be; there is a fair business in hoop, tank and boiler iron, but the inquiry for bars is light. Nearly all the mills have specialties of some kind or other, and for these generally there is a very fair demand, and, as a rule, the prices are more remunerative than for the ordinary makes. We continue to quote at 1.80c. to 1.90c. for merchant bars, and no good brands can be obtained below inside figure, some makers refusing to accept anything under two cents.

Nails.—The Nail market is in an unsatisfactory shape, owing to the break at Wheeling, noted in our last report. Pittsburgh makers, as a matter of necessity, have been obliged to meet the reduction, especially at the main points of distribution in the West, where they come in competition with Wheeling. Either your correspondent here or your proof-reader made a mistake in the report of last week in quoting the net price as sent out in the Wheeling circular at $2.15. It should have been $2.25 for less than 200 kegs, and an abatement of 10 cents per keg for 200 kegs and upward, with the usual discount of two per cent for cash. At the price quoted there is no margin for profit; indeed some makers allege that there is an actual loss, and this being the case, makers generally are not very solicitous for orders, and it is doubtful whether a large lot could be obtained at the prices quoted. It is unfortunate for makers that the break occurred, as the probability is that by the time it is fixed up the best part of the fall trade will be over. There is a possibility that the unremunerative rates may be the means, now that they have been generally adopted, of causing those who are responsible for them to come to terms and agree upon prices, affording a living margin for profit, and it is probable, in the event of a new list being adopted, that it will be closely adhered to. Nails are cheaper now than they were, if we mistake not, before the war, and then it should be borne in mind that there is less loss since the adoption of the "picker," there being scarcely any "slivers," which at one time were so common. There can be no risk in stocking up at quoted rates, and we would advise those who can do so not to let the opportunity pass, as the cost of production is down as low as it can possibly be reduced. Your correspondent, in concluding, would state that the report, started and given currency to by a Wheeling concern, that Pittsburgh nail manufacturers were using a good many old rails, and consequently turning out an inferior quality of nails, is untrue; none of our makers have used any old rails whatever, and very few have been used as yet at Wheeling.

Horse and Mule Shoes continue quiet and unchanged; the demand is not brisk apparently, as usual at this season of the year. Shoenberger & Co. continue to quote at $3.80 and $4.80 for 100 keg lots.

Wrought Pipe.—The Lap Welders' Association, as noted in a former report, remains intact, and the Association discounts are being closely adhered to, and while the Butt Welders' Association still exists they have no fixed rates, each firm, in order to meet competition, making their own rates. There is a very fair business, and it appears to be increasing. The National Tube Works are working up to their full capacity, double turn.

Steel.—The demand continues fairly active; all the mills are busy, but the market is devoid of any new phases deserving of special notice or to which mention has not previously been made. Manufacturers continue to complain that prices are being shaved very close.

Scrap.—The movement in old Rails continues very light and prices are weak but unchanged. There was an offer here from New York recently to sell at $21, 4 mos., but it is doubtful whether more than $20, 4 mos., would be obtained. The fact of the matter is there is a good deal of complaint in regard to the product of these old Rails, and the result is some of the manufacturers refuse to have an old rail about their mills, so jealous are they of the reputation of their Iron. Old Car Wheels still quoted at $20 to $21, 4 mos;; No. 1 Railroad Wrought Scrap, $24 per net ton.

The Standard Oil and Pennsylvania Railroad Companies.—The movement on foot for some time past on the part of the Standard Oil and Pennsylvania Railroad companies to buy out the Empire Oil and Transportation Company has been consummated at last, and this being the case the Standard is stronger than ever, and the result is generally considered as a triumph of the Standard over the Pennsylvania Railroad. It is now reported that the Standard is negotiating for the purchase of the Conduit Pipe Line.

BOSTON.

SEPT. 22.—*Iron.*—Pig continues to meet with an improved demand. We quote: $21.50 for No. 1, $20 to $20.50 for No. 2, and $19.50 to $20 for Gray Forge. Scotch Pig is as dull as ever. *Bar* continues unchanged, quoting $43 to $45 for Refined, and $35 to $36 for Common. Nails are in light demand at unchanged prices. Sheet is selling at 3c. to 3¼c. per pound. Russia is quiet at 12c., currency. We quote: English Spring Steel, 7c. to 8c., gold; 9c. to 11c. for German; 9c. to 11c. for Machinery; 14c. to 16c. for Cast; 10c. to 12c. for Blister; 8c. for American Spring; 13½c. to 14c. for Cast; 9c. for Blister, and 8c. for Machinery. *Copper.*—Since the movement of last week the market has assumed a quiet tone, but is firm. There have been sales in New York of 1,000,000 lbs. on the spot and futures at 18c. to 18½c. Of Baltimore 100,000 lbs. sold at 18½c. For Manufacturers we quote: New Sheathing, 28c.; Bolts and Braziers, 30c.; Yellow Metal Bolts, 25c. to 25½c.; do. Sheathing, 20c. *Lead* has sold for October delivery at 4¾c., currency. We quote: Pig 5c., to 5⅛c., currency. For Domestic Sheet, 8c.; Pipe, 7½c.; Tin-Lined Pipe, 15c.; Bar Lead, 7c.; all of these, excepting Pig, are subject to the usual trade or 10 per cent. discount. *Antimony* is quiet at 11¾c. to 12¼c., gold, for Boston spot lots, and *Spelter* is easy, closing at $6 on the spot for 10-ton lots. *Tin* maintains the improved tone of last week. Prices are nominally unchanged. We quote Straits, 15½c. to 15¾c.; Banca, 18c. to 18½c.; Refined English, 15c. to 15¾c., gold. We quote Plates: Charcoal, I. C., $7 to $7.25; Coke, $6 to $6.25, and Terne at $6.50 to $7, gold.—*Commercial Bulletin.*

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Sept. 22, write us as follows: PIG IRON.—The demand generally moderate, consumers having supplied their wants by recent purchases. We note considerable sales of Mill Iron during the past week. Prices are generally unchanged.

HOT-BLAST FOUNDRY.				
Hanging Rock No. 1, Charcoal	₱ ton.	$23.00	@	—4 mos.
Hanging Rock No. 2, Charcoal		22.00	@	—4 mos.
" No. 1 Coke		22.00	@ 24.00	—4 mos
" No. 2 "		21.00	@ 22.00	—4 mos.
" No. 1, Stonecoal		21.00	@ 22.00	—4 mos.
Virginia, No. 1 Coke		23.00	@	—4 mos.
" " No. 2 "		22.00	@ 22.50	—4 mos.
Ala. and Tenn., No. 1 Charc'l.		22.00	@ 22.50	—4 mos.
" " No. 2 "		21.00	@ 21.50	—4 mos.
Red-short, No. 1 Coke		23.00	@ 23.50	—4 mos.
Shawnee No. 1		22.00	@	—4 mos.
Alice No. 1 ex		23.50	@	—4 mos.
Alice No. 1		22.50	@	—4 mos.
FORGE IRONS.				
Hanging Rock No. 1 Charcoal	₱ ton.	$20.00	@ 21.00	—4 mos.
Hanging Rock No 1 Coke		19.50	@ 20.50	—4 mos.
Virginia, No. 1		18.50	@ 19.50	—4 mos.
Ala. and Tenn. No. 1 Charc'l.		18.50	@ 19.50	—4 mos.
Red-short, No. 1 Coke		21.00	@ 22.00	—4 mos.
Cold-short, No. 1 Stonecoal		18.00	@ 19.00	—4 mos.
CAR WHEEL AND MALLEABLE.				
Hanging Rock	₱ ton.	$35.00	@ 38.00	—4 mos.
Southern and Western Brands		27.00	@ 33.00	—4 mos.
ORE.				
Lake Superior		8.50	@	—cash.
Virginia Hematite (Washed)		4.25	@	—cash.

ST. LOUIS.

Specially reported by Messrs. SPOONER & COLLINS, Iron Commission Merchants, 217 North Third street, St. Louis, under date of Sept. 19: There is no perceptible change in the condition of our market since last report. Trade continues good and prices remain firm at quotations. We quote same as last.

	No. 1.	No. 2.	Mill.	White and Mot'ld
Missouri Stone Coal	$22.00	$21.00	$20.00	$19.00
Missouri Charcoal	22.00	21.00	20.00	20.00
Tennessee Charcoal	22.50	21.00	20.00	19.00
Southern Coke, very soft and strong	23.00	21.00	20.00	18.50
Hanging Rock Charcoal	25.00	24.00	23.00	.....
H. R. Charcoal, Cold-short	24.00	23.00	.....	.....

	Extra No. 1.	No. 1.	B. No. 1.	No. 2.
Hanging Rock Coke	25.00	24.50	24.00	22.00
West Virginia, Coke	23.50	23.00	22.00	21.50

COLD-BLAST CHARCOAL—All Numbers.

Hanging Rock	$25.00 @ 38.00	4 mos.
Tennessee	26.00 @ 30.00	4 mos.
Kentucky	26.00 @ 30.00	4 mos.
Missouri	26.00 @ 30.00	4 mos.
Georgia	26.00 @ 30.00	4 mos.
Alabama	26.00 @ 30.00	4 mos.
Assorted Bar Iron	26.00 @ 30.00	4 mos.
No. 1 Railroad	@	$2.00 rates.
Machinery Scrap	1.00 per	hundred
Heavy Cast " "	.80 @	"
Light Cast " "	.65 @	"
Old Rails	.55 @	"
Old Car Wheels	19.00 @ 20.00	4 mos.
	17.00 @ 18.00	4 mos.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of Sept. 24, write us as follows: Business in all grades of Pig metal is active, but so far it has not had the effect to raise prices. The usual time, 4 mos., is allowed on the quotations below:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$23.00 @ 24.00
No. 2 " "	20.00 @ 21.00
No. 1 Southern, Charcoal	20.00 @ 21.00
No. 2 " "	19.00 @ 20.00
No. 1 Hanging Rock, Stonecoal and Coke	20.00 @ 22.00
No. 2 Hanging Rock, Stonecoal and Coke	19.00 @ 20.00
No. 1 Southern, Stonecoal and Coke	19.00 @ 20.00
No. 2 " "	18.00 @ 19.00
"American Scotch"	20.00 @ 22.00
Silver Gray	18.00 @ 19.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neut'l.	18.50 @ 19.50
No. 1 Stonecoal and Coke, Cold-short and Neutral	18.00 @ 18.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	17.50 @ 18.00
No. 1 Missouri and Indiana Red-short	21.00 @ 22.00
White and Mottled, Cold-short and Neutral	15.00 @ 16.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	34.00 @ 38.00
Alabama and Georgia, Cold-blast	25.00 @ 33.00
Kentucky, Cold-blast	25.00 @ 33.00

W. B. BELKNAP & Co., Iron Merchants, Louisville, Ky., under date of Sept. 24, report stirring times among the jobbers, all having as much as they can do, and many being largely behind their orders. The mills at Cincinnati and here are crowded with work, and the improvement in Iron prices, Bar, Sheet and Plate, is fully maintained. Nails alone fail to respond to the increased demand, the action of the Wheeling mills in putting out a low card at a time when they are shut out from competition for the Southern trade by the low stage of water in the river, preventing the lower mills from reaping the full advantage of the situation.

CHATTANOOGA.

Specially reported by S. B. Lowe, Dealer in Metals, under date of Sept. 24: There has been considerable activity in Iron the past week, and sales of 2100 tons are reported, mostly mill grades. Old Rails have advanced 50c. per ton, with sales of most that are offered. In Foundry grades the supply is short, and some of the furnaces are sold ahead, while prices generally are unchanged, yet a better feeling seems to prevail.

COKE.

No. 1 Foundry, extra	$20.00 @ 21.00
No. 1 Foundry	19.00 @ 20.00
No. 2 Foundry	17.00 @ 18.00
Gray Forge	15.00 @ 16.00
White and Mottled	14.00 @ 15.00

HOT-BLAST CHARCOAL.

No. 1 Foundry, extra	$19.50 @ 20.50
No. 1 Foundry	19.00 @ 20.00
No. 2 Foundry	17.00 @ 18.00
Gray Forge	16.00 @ 17.00
White and Mottled	15.00 @ .....

COLD-BLAST CHARCOAL.

Car Wheel Metal	
" extra	$22.50 @ 27.50
Forge Metal	24.50 @ 29.50
Muck Bar	17.50 @ 22.50
Old Car Wheels	29.00 @ 34.00
Old Rails per ton	17.00 @ .....
Brown Hematite Ore 50 to 56 per cent. per ton	16.00 @ 17.00
Red Fossiliferous Ore, 50 to 56 per cent. per ton	1.75 @ 2.25
Nails	1.50 @ 1.75

R. R. Spikes	2½c.	Bar Iron	2c.
Light Rails	2¼c.	Track Bolts	3c.
Ingot Copper	20c.	Trestle Bolts	4c.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel Merchants, 46 and 48 South Charles street, report us the following prices, under date of Sept. 24: There was a decided, perceptible improvement in trade circles for the past week, and the amount of business done will more than double that of any two previous weeks for some time past. We quote the market firm at annexed figures:

AMERICAN REFINED BAR IRONS.

1 to 6 wide by ⅜ to 1 thick, 1 to 4½ wide by 1⅜ to 2 thick	1.95 to 2c. ℔
Round and Square, ordinary sizes from ¾ to 2 inclusive	"
Hoop iron, 1¼ wide and upward	1.95 to 2c. "
Band Iron, from 1¼ to 4 in. wide	2¼ to 3c. "
Horseshoe Iron ¾ to 1 wide by ⅜ to ½ thick	2¾ to 3c. "
Norway Nail Rods	3¾ to 3½c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	5½ to 6c. "
Machinery Steel	14½ to 15c. "
Cast Spring Steel	8c. to 9c. "
Homogeneous Steel Plate	7½ to 8c. "
Perkins' Horseshoes, per keg of 100 lbs.	8½ to 9c. "
" Muleshoes	$4.02½
R. R. Spikes	5.02½
Common Horse Nails, from 14c. to 18c. per pound	2¾c. to 2½c.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per ℔
Globe Horse Nails	23	24	25	26	28c.	per ℔

Messrs. R. C. HOFFMAN & Co., Iron and Commission Merchants, No. 23 South Frederick street, report the Pig Iron market as follows, under date of Sept. 24: We note a decidedly improved feeling in the Iron market, with increasing sales at about quotations.

Baltimore Charcoal	$29.00 @ 31.00
Virginia	28.00 @ 31.00
Anthracite No. 1	19.00 @ 20.00
" No. 2	18.00 @ 19.00
" No. 3	17.00 @ 18.00
White and Mottled	15.00 @ 16.00

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of Sept. 24: Wheel and general foundry grades of Pig Iron continue in fair demand without change in quotations.

Va. Cold-blast Charcoal, Cold-short	$21.00 @ 25.00
Va. " " Neutral	29.00 @ 31.00
Anthracite, No. 1 X	20.00 @ 21.00
" No. 2 X	19.00 @ 20.00
" No. 2	18.00 @ 19.00
Coke, No. 1 X (West Virginia)	22.00 @ 23.00
" No. 2 X "	21.00 @ 22.00

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels).

PARIS, Sept. 9, 1877.—*Metals.*—Politics again look less reassuring in France, and business has been somewhat affected in consequence during the week, more particularly so as regards the sale of manufactured goods; raw material is moving off about as well as heretofore. *Copper* recovers with difficulty, and we have again to report a slight giving way. There have been exported from the West Coast of America, during the first six months, 24,404 tons, against 25,614 in 1876, while the charters during the first eight months have been 28,400 tons, against 31,300 in 1876. England's import during the first seven months has been 54,945 tons, against 45,918 in 1876, and its export 29,250 tons, against 28,658. The stock of Chilean Copper at Havre, 1st instant, was 7916 tons fine, against 5675 in 1876. The visible supply in England and France, 1st instant, was 35,437, against 30,54- in 1876. The price of Chili Bars at London was £67, against £72 in 1876, £83 in 1875, £78 in 1874, and £73 in 1873. The foregoing statistics hardly call for comments, inasmuch as they clearly indicate that although the shipments on the West Coast have fallen off, stocks in Europe have accumulated in consequence of a diminished consumption. It is consequently by no means surprising that we should have steadily declined. We are weak here, and good brands Chili Bars have to be quoted 173 francs the 100 kilos.; first brands, 180, and ore, 185. Marseilles is quiet and quotes Spanish slabs 165; Red Tokat, 170; small Ingots, 175 to 180; Sheathing, 210; Bolts, 220, and Yellow Metal Sheathing, 205. *Tin* suffers from the same drawbacks as Copper; there is too much of it in view of the but moderate consumption. The unusually protracted rainy season in Australia has enabled antipodean producers to turn out Tin without interruption, and the decrease in the Straits has counted for very little. The visible supply in England and Holland is now 16,654 tons, against stock alone is 10,074, against 7730 a year ago. No wonder, then, that we should have dropped so low. Tin is quiescent at Paris; we quote Banca 182.50 francs the 100 kilos.; Billiton, 179.50; Straits, 172.50; Australian, 170, and English, 172.50. Marseilles is weak and nominal. *Lead* has been stiffening up a little. We quote here 50.50 to 51 francs the 100 kilos. Marseilles is also looking up, and quotes first fusion, 40; Sheet and Pipe, 53, and Shot, 54. *Spelter* is without feature; we quote Silesian 50.50 francs the 100 kilos. Marseilles unaltered at 67 to 68 francs for Sheet Zinc, and 41 for old remelted. *Iron.*—The general situation has improved a little. Here 400 tons Merchant Iron have been taken during the week. In view of the fall and winter season drawing near, there is a better demand for stove Iron. The orders for the Exhibition buildings are but moderate just at present. Messrs. Eisel & Co., however, received one large order to the amount of 430,000 francs. At the North, architectural Sheet Iron of 3-millimeter thickness is bringing 222 to 225 francs. All rolling mills and forges are actively engaged. In the Ardennes there is some business doing in Sheet Iron for export and material for our navy. In Lorraine, affinage Pig Iron is weak. Moulage ditto, No. 1 to 6, 85 to 67 francs. In the Haute-Marne special Iron is wanted; Coke Iron, 272.50 to 275. Nails neglected. Production thereof has decreased. At the center the Rhone basin is a little better off. The Chatillon-Commentry Society has now acquired the privilege of manufacturing Martin Steel. In the Loire there are but government orders. *Coal* is flat and the outlook anything but encouraging.

BELGIUM.

(Revue Universelle).

BRUSSELS, Sept. 9, 1877.—*Iron.*—There is still a lack of orders; the market is in a languishing mood. Our iron works are moderately active. In the Hainaut, Pig Iron is dragging; several blast furnaces have nevertheless been blown in. There is as yet no tendency toward improving values in Belgium, but on the contrary, weakness still prevails, and a further slight giving way has to be noted. On the 26th inst. some important adjudications will come off at Breslau, in Silesia, for 25 passenger locomotives with their tenders, 10 extra tenders, 200 cars, 400 pairs of axles, &c. We invite the attention of our railroad supply manufacturers to the San Jose de Guatamala Railway to Escuinta, a line of some importance, the building of which will commence a couple of months hence. Julio Nanne, the director of the work, should be addressed. The "East Indian" Railroad Company in British India, will stand in need of 50 locomotives, and we hear that American locomotive builders are making a great effort to obtain the job. We trust Belgian locomotive builders will bestir themselves. *Coal.*—The Hainaut Coal mines last year turned out 10,487,000 tons of Coal, a decrease of 481,000 tons from 1875.

GERMANY.

(Borsenhalle).

HAMBURG, Sept. 8, 1877.—*Metals.*—The German metal markets have been devoid of any particular feature during the week. Prices on the whole have been steady notwithstanding a lack of activity in the various metals, which come quoted as follows: At Berlin, *Copper*, English and Australian, 75 to 78.50 marks the 50 kilos, and Mansfield, 78.25 to 78.50; here Drontheim, 79; Quincy, 90; Minnesota, 100; Best Selected, 76 to 77; Tough Cake, 74 to 75; English Sheathing, 85 to 86; and Yellow Metal, ditto, 73 to 74. At Stettin, Swedish, English and American, 85 marks. *Tin.*—Berlin quotes Banca 74-75 to 75 marks the 50 kilos, and English Refined, 73.50 to 74. We quote Banca 73 to 74. Stettin quotes Banca, 77.50 to 80 marks. *Lead.*—Berlin quotes Tarnowitz, Hartz and Saxonian, 20.25 to 20.75 marks the 50 kilos. We quote here, English Pig, 23 to 23.50; ditto, Sheet, 23.50 to 24; German Pig, 22.50 to 23; Spanish, 24 to 25; English and Dutch White Lead, 33 to 33.50. Stettin quotes Spanish Lead, 26 to 26.50; Tarnowitz, 24, and sundry German sorts, 24. *Spelter.*—Berlin quotes Silesian, good brands, 19.25 to 20 marks the 50 kilos. Breslau quotes Common Silesian, 18 to 18.25 to arrive; W. H., 18.50. We quote here, Silesian in slabs, spot and to arrive, 20; Sheet Zinc, 25.50 to 26; Vieille Montagne, 26.30; Sheathing, 27.30; Zinc White, 28 to 31; Gray, 25.50 to 29.50

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, Sept. 11, 1877.—*Tin.*—The market has relapsed into dullness and some lots of Banca Tin have changed hands at 40¼ guilders, on the spot, and to be delivered from the impending September auction, at 40, while Billiton has sold at 38¾, both on the spot and to arrive.

CHINA.

Arnhold, Karberg & Co.

CANTON, August 10, 1877.—*Coal.*—There has been no change for the better in the position of this market during the past fortnight. The inundation of supplies being still unchecked the depression continues, and a further retrograde movement is discernible. Australian Coal is now unsalable at better than $7.75 per ton, while Cardiff cannot be moved without difficulty at $8.50 per ton. Consumers generally are too much encumbered with their previous purchases to operate to any considerable extent, even if prices were to remain as they are, and unless shipments from England and Australia are entirely stopped for some time to come, there is but very little prospect of our market soon recovering from the utter prostration into which it has been thrown by the oversupply.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., Sept. 10, 1877.

THE TRADE OUTLOOK

has not brightened much, I must confess, since I last wrote, yet I still am of opinion that there is an alteration for the better in quiet progress here and there, and that the recent reduction in finished iron prices, the steady limitation of pig iron production, the increased vigor of several foreign markets and the unfortunate wants of India, are all combining to render more cheerful the trade prospects of the decline of the year. It is, of course, very possible for the least sanguine people to be upset in their expectations, but I think that in this case the coolest observation and the most rigid inquiries will lead to the conclusion that the last quarter of 1877 will be characterized by more extensive commercial operations than its three predecessors. In several branches of the business directly under my own daily observation, I can vouch that there is a decided improvement, while in other directions I hear of similar alterations. At the same time it is impossible to deny that many departments of the iron trade proper remain utterly paralyzed. This is especially the case at the forges, large and small, not only here and in Staffordshire, but in every iron making district of the kingdom, which accounts for the long rows of empty houses one sees near most of the iron works, and the reports of an "unusual abundance" of labor in the agricultural districts during the present harvest. In some respects the appended official figures of the Board of Trade, confirm the reports of improved trade which I have forwarded on previous occasions, and notably in respect of the augmented demand from the States for British cutlery. In other particulars these returns show to advantage and may well be perused by your manufacturers. Whether they will show to better advantage next month one cannot yet say, but such a result seems to be assured, unless the blighting, desolating, benumbing influence of this war in the East should, in some way, spread and throw out one of its octopus-arms in such a manner as to check the incipient amelioration to which I refer.

THE AUGUST EXPORTS

as fully detailed by the Board of Trade returns were of the aggregate value of $17,746,662, whereas in August, 1876, the value was £17,962,884 and in August, 1875, £19,418,876. It will be seen from the tabular statistics that the decrease has been in values rather than quantities, and that in several branches the quantities have increased as compared with last year. In iron bars, for instance, the value has decreased from £46,263 to £41,572, while the quantity advanced from 3648 tons last August to 4284 tons this. In small firearms, too, we sent off 19,640 last month and 17,017 in August, 1876, but we only got £17,375 for them this time as against £20,961 the year before. In hardware and cutlery the augmented value is about £6000, so that in the bulk the increased trade must be considerable. Of pig-iron, again, we sent off 85,889 tons, for which we received £242,432, while in August, 1876, the value of 77,823 tons was £245,374. As regards "bars, angles, bolts and rods" we sent off 22,306 tons, against 17,496 tons in the same month of last year, the respective values being £171,985 and £148,243, showing these prices to have been fairly, but not wholly, maintained. In wire (not telegraphic) we sold 3,885 tons to foreign buyers last month for £59,149, whereas last year we got £63,441 for 3838 tons. For 19,279 tons of hoops, sheets, boiler and armor plates we received £228,495 last month, while in August, 1876 we sold 16,825 tons for £245,965. For 12,230 tons of tin plates we received £237,523 last month as against 12,026 tons and £255,053 last year. In telegraphic wire there has been an immense increase, the values being £70,089 this August against £19,945 last year. It will be seen by the figures below that in coal, railroad iron, cast or wrought, unwrought steel, machinery and plated wares there has been a less business (comparatively) done. The first table relates to

COAL, COKE, AND OTHER FUEL.—TONS.

To	Aug. 1876.	Aug. 1877.
Russia	189,665	181,317
Sweden and Norway	145,058	170,393
Denmark	83,144	77,478
Germany	239,407	213,434
Holland	56,349	50,222
France	268,873	250,330
Spain and Canaries	71,445	69,474
Italy	152,375	108,560
Turkey	25,411	15,012
Egypt	52,883	35,055
Brazil	31,093	35,195
Malta	13,253	18,802
British India	78,350	101,514
Other coutries	274,720	277,413
Total	1,682,026	1,604,198

UNWROUGHT STEEL.—TONS.

To	Aug. 1876.	Aug. 1877.	1876.	1877.
France	243	204	£9,615	£8,347
United States	640	412	21,663	14,769
Other countries	1,270	1,409	40,266	40,204
Total	2,153	2,025	£71,544	£63,320

HARDWARE AND CUTLERY.

To	Month ended Aug. 31. 1876.	1877.	Eight months ended Aug. 31. 1876.	1877.
	£	£	£	£
Russia	6,811	5,928	50,267	34,085
Germany	17,255	17,170	155,743	137,121
Holland	9,360	6,905	70,831	59,503
France	10,552	10,110	91,384	78,902
Spain and Canaries	13,196	10,398	81,621	77,969
United States	31,686	36,641	249,810	213,915
Spanish West India Islands	8,193	9,350	53,026	79,075
Brazil	18,272	18,446	176,187	153,216
Argentine Republic	3,372	3,769	41,070	26,549
British N. America	11,509	12,402	110,958	110,729
British India	16,076	20,054	184,256	208,537
Australia	40,654	44,334	382,645	356,317
Other countries	83,505	80,918	714,435	607,159
Total	270,441	276,425	2,360,238	2,143,077

STEAM ENGINES.

To	1876.	1877.	1876.	1877.
Russia	27,501	11,369	104,811	49,671
Germany	16,833	21,189	71,114	89,026
France	1,615	1,514	20,986	28,395
Spain and Canaries	6,589	5,320	41,828	64,621
Italy	31,046	1,895	142,009	126,819
Egypt	10,135	370	26,906	6,248
Brazil	2,188	3,029	46,021	31,879
British India	14,103	17,944	154,906	201,242
Australia	14,401	13,364	142,669	195,906
Other countries	77,056	78,874	575,357	503,999
Total	202,067	154,814	1,346,607	1,297,426

OTHER MACHINERY.

To	1876.	1877.	1876.	1877.
Russia	94,140	46,419	472,016	217,048
Germany	45,400	68,895	413,942	391,265
Holland	17,413	14,574	180,103	129,431
Belgium	23,195	22,661	214,277	157,551
France	56,056	38,574	447,140	378,591
Spain and Canaries	24,830	27,047	172,911	211,877
Egypt	6,801	.....	49,591	23,558
United States	13,106	8,836	157,605	197,494
British India	49,490	56,723	421,034	419,230
Australia	27,639	33,639	216,300	198,668
Other countries	106,213	87,420	857,883	776,225
Total	464,334	404,798	3,622,813	3,011,638

The special rail returns to 31st August of the years named are as follows:

IRON RAILS.

To	Quantities.—1876. Tons.	1877. Tons.	Value.—1876. £	1877. £
Russia	604	74	4,223	539
Sweden & Norway	3,953	4,370	26,563	33,501
Germany	292	.....	2,045	.....
Spain	861	506	6,059	3,040
Italy	131	270	786	1,890
United States	.....	.....	.....	.....
Brazil	1,984	3,467	15,509	22,085
Chili	.....	133	.....	834
British N. America	5,301	351	36,722	2,106
British India	4,085	1,568	30,984	11,065
Australia	1,038	3,828	8,192	26,011
Other Countries	2,934	1,926	19,875	12,061
Total	21,273	16,473	751,558	113,222

STEEL RAILS.

To	1876.	1877.	1876.	1877.
Russia	13,042	7,796	118,575	60,854
Sweden & Norway	559	1,664	5,269	14,830
Germany	2,046	6,132	20,958	44,557
Spain	319	982	3,033	6,874
Italy	183	.....	1,767	.....
United States	.....	.....	.....	.....
Brazil	.....	786	.....	7,075
Chili	.....	.....	.....	425
British N. America	8,204	2,562	68,081	21,571
British India	10	247	138	1,735
Australia	155	627	1,550	4,789
Other Countries	493	592	4,316	4,153
Total	25,011	21,440	223,687	166,863
Total of iron and steel rails	46,284	37,913	375,245	280,085

MISCELLANEOUS EXPORTS.

	Quantities.—1876.	1877.	Values.—1876.	1877.
Fire arms (small) No.	17,017	19,640	£20,961	£19,375
Brass, manuf. of, not heavy ord. cwt.	8,000	9,400	43,617	47,811
Railway carriages, for pass'grs. No.	29	12	7,294	5,075
Railway trucks, wagons, &c.	425	75	38,243	5,836
Copper, unw't. cwt.	18,540	17,278	72,574	66,055
" w't. cwt.	18,840	18,436	82,184	79,144
Mixed or yellow metal sheathing	17,899	32,660	65,319	111,751
Iron, pig tons.	77,823	85,889	245,734	242,432
Bar, angle, &c. tons.	17,496	22,306	148,243	171,985
Iron and steel wire (except tel. wire), galv, or not. tons.	3,838	3,855	63,441	59,149
Hoops, sheets, &c., tons	16,825	19,279	245,965	228,495
Tin plates tons.	12,026	12,230	255,653	237,523
Cast or w't tons.	21,774	19,238	372,608	278,247
Old, for re-man. tons.	2,508	1,546	10,042	7,183
Man. of steel or steel and iron tons.	959	988	68,939	59,520
Lead—Pig, rolled, &c. tons.	4,216	5,002	89,771	103,206
Plate and plated and gilt wares	.....	.....	15,506	14,438
Tel. wires and apparatus connt'd therewith	.....	.....	10,945	70,089
Tin, unw't cwts.	7,373	10,931	28,907	3,911

THE IRON WORKERS' UNION

have just published their annual report, which shows only a moderate degree of prosperity. The income for the year had been £1,674, and the expenditure £1,115, leaving a balance of £559 odd, to be added to the reserve fund, which now amounts to £4,313. Among the leading items of expenditure are £61 for "delegations," and £101 for law expenses, not to omit the mention of £128 for "funerals," and £47 for "aliment." I think I would take "aliment," as a matter of choice.

THE LABOR MARKET

has been somewhat less excited during the week, owing to the settlement of one or two disputes, and the less threatening aspect of others. The Fife and Clackmannan miners have at length submitted to a reduction of ten per cent., after having been on strike fourteen weeks, during which period they have expended £21,000 of the Union funds, and have lost £45,000 in wages, besides occasioning their employers a loss of £159,000. A sliding scale will be arranged for future wages. The London building trade strike is dwindling down, but that at Manchester continues. At the latter place some of the American carpenters have just arrived. In Lancashire the cotton spinners have notified a general reduction of working time to four days weekly. At Bolton the work-people, numbering 12,000, are still out for reasons detailed in my former letter.

TURKISH WAR MATERIALS,

from your ports are giving profitable employment to three steamers owned, for the most part, in Sheffield. These vessels are the John Bramall, the Nellie Martin, and the J. B. Walker. They have earned dividends, per share, of £50, £47 and £45, each carrying consignments to Constantinople, and the J. B. Walker, has just cleared a second dividend (this year) of £45. The freight charged each voyage from New York or New Haven is £55.00, and the cargo, of course, is arms and ammunition for the "unspeakable Turk."

SCOTCH PIG IRON

has been quiet, but with a sufficient shipping business doing to prevent any depreciation of makers' prices, although the stock now reaches 158,701 tons, an increase of 1479 on the week. The total shipments this year up to date, have been 187,302 tons foreign, and 128,460 tons coastwise, showing an increase this year of 9077 tons.

On September 4, Messrs. Wm. Colvin & Co. said: To-day there has been a large business done from 54/8 to 54/7 cash, and from 54/9 to 54/7½ one month, closing with sellers at 54/9 one month, and 54/7 cash, and buyers offering a fraction lower. Makers' iron remains steady, without change in prices."

On September 8, Messrs. James Watson & Co. wrote: "We have to report a very steady market during the past week, prices ranging from 54/5 to 54/8 cash, closing to-day at 54/6 cash. The undernoted show a slight reduction from last week's quotations. Shipments last week were 928 tons, against 9037 tons in the corresponding week of 1876. We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	55	52 6
Gartsherrie, "	62 6	55
Coltness, "	67	55
Summerlee, "	60	54 6
Langloan, "	64	55
Carnbroe, "	57	53
Calder, at Port Dundas	61	53 6
Glengarnock, at Ardrossan	60	54 6
Eglinton, "	56	54 6
Dalmellington, "	55 6	52 6
Shotts, at Leith	61 6	52 6
Kinneil, at Bo'ness	56 6	52 6

The prices current of John E. Swan & Bros. (Limited), of the same date, gives the following:

Gartsherrie, No. 1	62/
Coltness, "	67/
Glengarnock, "	59 6
Eglinton, "	55 6
Ballast pig iron alongside	45/

THE CLEVELAND IRONMASTERS' RETURNS for August have been issued, and are worthy of perusal, as showing the position of what is probably the greatest iron smelting district in the world. They are as under:

	Furnaces—In Blowing.	Out or damped.	Built	Total.
Total for August, 1877	106	58	2	162
Total for August, 1876	112	48	.....	160

Make of Pig Iron.

	Port of M'borough. Tons.	Total of District. Tons.
Month ending 31st Aug., 1877	121,501	171,622
Month ending 31st Aug., 1876	109,125	171,398
Month ending 31st July, 1877	124,693	180,799
Decrease upon July, 1877		177
Increase upon Aug., 1876		224

Shipments Foreign of Pig Iron from Port of Middlesborough.

	Tons.
Month ending 31st Aug., 1877	33,219
Corresponding month last year	28,215
Increase upon Aug., 1876	5004

Shipments Coastwise of Pig Iron from Port of Middlesborough.

	Tons.
Month ending 31st Aug., 1877	39,473
Corresponding month last year	33,112
Increase upon Aug., 1876	6361

Makers' Stocks

	Port of M'borough. Tons.	Total of Dist. Tons.
31st July, 1877	135,783	229,321
31st Aug., 1877	138,107	229,971
Increase upon July, 1877		650

Stock in Warrant Stores.

	Tons.
31st July, 1877	21,217
31st Aug., 1877	24,950
Increase upon July, 1877	3733

Abstract.

	Tons.
Increase in make upon July, 1877	9177
Increase in makers' stocks upon July, 1877	650
Increase in stock in warrant stores upon July, 1877	3733

It is stated that Hopkins, Gilles & Co., have now seven Danks' revolving furnaces at work, making iron which they guarantee equal to best Staffordshire, and which sells readily at £8 per ton. Ship plates fetch £6.12/6; common bars, £5.17/6; angles, £6./5, and puddled bars, £5.17/6.

THE IRON AND STEEL INSTITUTE autumnal programme is now completed and comprises the following interesting list of papers and discussions: Adjourned discussions: "On the North Lincolnshire Iron District, by Mr. G. Dove, Jr.; "On Chaudron's Method of Shaft Sinking through Water-Bearing Strata," by Mr. Henry Simon. New papers: Part II. of paper "On the Separation of Carbon, Silicon, Sulphur, and Phosphorus in the Refining and Puddling Furnace and in the Bessemer Converter," by Mr. I. L. Bell, M. P., F. R. S.; "On some Scientific Facts Connected with the Manufacture of Iron, &c.," by Dr. Percy, F.R.S.; "On Mechanical Puddling, by Mr. R. Howson; "On Improvements in Blast Furnace Water-Cooled Tuyeres," by Mr. T. W. Plum, Old Park, Salop; "On the Manufacture of Coke in Relation to the Iron Trade of the North of England," by Mr. A. L. Stevenson; "On the Geological Features of the Great Northern Coal Field," by Mr. Greenwell; "On Four Years' Improvements in the Utilization of Slag," by Mr. Chas. Wood; "On the Removal of Phosphorus from the Materials used in Smelting Pig Iron under M. Stein's Patent," by Mr. F. Giesbers; "On the Latest Improvements in Belgian Merchant Rolls," by Mr. A. Thomas; "On a New Machine for Drilling Ironstone," by Mr. William Walker; "Results of Experiments with Cannon Manufactured from Steel without Blows," by M. Gautier, C. E.

TRADES OF SHEFFIELD.

In the general iron trade matters are quiet, but the better state of things which undoubtedly prevails in some other branches has given rise to a rather more hopeful feeling. One of the leading local firms of iron producers and merchants, in their September circular say, nevertheless, "The stagnation in both the pig and finished iron trade still continues. Prices seem to be at the lowest point, as makers are steadily reducing the production and bringing it down to the actual wants of consumers." This so fully and authoritatively describes the situation that I will not dwell further upon it, than state that at some of the local works wages are being lowered by 10 per cent. Where the men will not consent to the drop there is a process of "depletion" which is weeding out every possible spare man. At several of the Bessemer works, which are certainly the best employed establishments in any line just now, the rail and converting men have been asked to accept lower rates of wages.

There is still a good deal of uncertainty as to the probable issue of the existing difference of opinion between the coalowners and the miners. There was a conference between the two sides on Friday last, at which the representatives of the men declined to accept any reduction whatever. It now remains to be seen whether the employers will proceed with their notices for a reduction—which they say should at least be 5 per cent. The men appear to be in unison in resisting. They say the coal trade is much better at some of the pits, they allege that the masters are not all at one in asking for the drop, and they state that they can now hardly earn decent wages even at the present rates of payment. If the coal-owners persist, I have no doubt that a strike would ensue unless arbitration could be agreed upon. The uncertainty is having the effect of making fuel firmer in price, particularly slack and good hards.

The directors of the Staveley Coal and Iron Company recommend a dividend of £2 10s. per share on the A and C shares, and 8s. 4d. per share on the B and D shares, for the half-year ending June 30, similar dividends having been paid in February last.

At one of the leading local iron works I hear of an order for ship frame plates having been received on account of the Dutch government. These plates are made of best charcoal iron, and in this case are required in some bulk.

On Friday and Saturday last, one of Mr. W. A. Wood's American sheaf binding machines was tried on the Burnt Leys farm, near Worksop, the trial being very largely witnessed by farmers and others. The machine appeared to do its work very well, but an opinion was expressed that the really successful sheaf binder must be one which will utilize the straw itself for binding, so as to avoid subsequent accidents to the thrashing machines and to cattle eating the straw, from the wire used by the present experimental ones.

In the cutlery branches there is a better business doing, particularly on account of the United States, Indian and Australian markets.

For some weeks past there have been rumors of an amalgamation between one of our oldest steel houses and another equally old steel, saw, &c., concern. I now learn, on what I am bound to accept as very high authority, that these rumors are correct, and although no details are as yet attainable, I gather that Sanderson Brothers (Limited) have become amalgamated with Newbould & Co. (Limited), and that the title of the former concern is thereby effaced and its stock in trade, &c., transferred to the latter. Since the establishment of their American works the proceedings of Sanderson Bros. have naturally been of interest, and I do not doubt that particulars of this transfer and of the future of the shareholders will be of much local interest as well as of some importance to various persons in America. I surmise, from what I am quietly told, that Sanderson Brothers' future will be better than their past, and that in getting rid of the steel business proper there is another "move" in course of execution which will pay—probably exceedingly well. On this head, too, I cannot at present violate a promise not to forestall arrangements now in progress by mentioning the facts too prematurely.

THE BIRMINGHAM AND STAFFORDSHIRE

trades remain quiet, and it cannot be said that the recent drop in prices has brought much grist to the makers' mills. By the revised list Lord Dudley's round oak iron runs at £9. 2/6 for bars; best singles sheets, £10. 10/; doubles sheets, best, £12; trebles, best, £14; rivet iron, £11. 10/ up to £14. 10/; angles, £9. 12 6, and T iron, £10. 2/6; hoops and strips up to 14 W. G., £10. 2 6, and up to 20 W. G., £12. 2/6—all of which figures are a drop of 10/ per ton. The same prices are those of Messrs. Barrows & Hall, by G. B. Thorneycroft & Co.; E. P. & W. Baldwin, and the other list firms. Messrs. Baldwin's singles sheets up to 20 W. G. are £12. 10/ for "Severn;" £14 for B "Baldwin-Wilden;" £15 for B. B.; £16. 10/ for B. B. B.; £21. 10/ for B. charcoal, £23. 10/ for E. B. charcoal. Doubles up to 24 W. G. are 30/ per ton extra, and trebles 25 to 27 W. G. £3 per ton extra. Ordinary maked bars are now £8. 10/, which is the present quotation for B. B. H., the miter brand, John Bagnall & Sons, Summerhill, Brown & Freer's, Lee & Boltons, and other similar iron. Common bars are to be had at any price from £5. 17/6 to £7, and a fair middle-class bar at £7. 10/. There is a fairly well sustained shipping demand for Australia, India, New Zealand and Canada, but no activity in any direction, the home trade being rendered doubtful by reason of the precarious harvest. In some of the hardware branches there is a fair amount of work in course of execution, chiefly in respect of gas fittings, chandeliers, iron and copper tubing, brass sheets for stamping and ammunition purposes, copper and brass wire, electro-plated goods and edge tools. Cut nails are lowered 10/ per ton, and best hinges 2½ per cent. and 1-6 per cwt. cheaper.

SOUTH WALES AND MONMOUTHSHIRE

again furnish me with no particular news, save that at Ebbw Vale another rail mill has been started, a few additional orders having been secured there. The new steel plant at Rhymney is being rapidly pushed on with and is nearing completion. It is all of the most modern planning. At some of the Welsh works 30-feet rails are being rolled in one heat. I may say that in all quarters single-headed rails are now the rule, as the practical railway men do not like double-faced rails for many reasons. Last week's exports of iron and steel from the South Wales ports were 3665 tons—mostly for Sweden, the Cape and Canada. The coal exports reached a total of 98,364 tons. The tin plate trade remains quiet all round despite the restricted output, and prices do not seem to go up.

THE METAL MARKETS

have remained very quiet, with but small sales. *Lead* is, perhaps, in most demand.

Messrs. Von Dadelszen & North say: "*Copper* has been dull. Chili bars sold at £67 for G. O. B., and £67. 7 6 to £67. 10/ for named brands up to £68. 10/ for best brands. In Australian small sales of Wallaroo cake have been made at £80 to £80. 15/, and of Burra about 100 tons sold at from £73. 10/ to £74. English tough is quoted £73 to £74; select, £75 to £76; sheets, £79 to £80. *Tin* has been inactive; small sales of Straits at £64, 15/ to £65, and of Australian at £63 15/ to £64, with several parcels for delivery in sellers' option during the next three months at £63. 10/ to £63. 15. The Dutch market is quiet; Banca, 40fl. to 40½fl.; Billiton, 38fl. to 38¼fl. The Dutch Trading Company's sale will take place in Rotterdam on the 26th inst., and consists of 21,700 slabs Banca and 3500 slabs Billiton. English ingots, £68. 10/ to £70. Tin plates quiet and unaltered. *Lead* firm; £20 to £20/5 for English pig. *Spelter* £19. 2/6 to £19. 17/6 for ordinary brands. *Quicksilver* declined to £8. *Antimony*, £48 to £49."

The *Mining Journal* remarks: "The tendency of our markets this week has been downward, and the amount of business passing altogether insignificant. Stocks of copper, tin and iron increase, and this is a convincing proof of over production, the effect of which will be more severely felt than ever in the further depreciation in prices, which is the natural result of supply being in excess of demand. There is no expectation of higher prices, as the increasing facilities afforded for the production and transit of metals enable producers to sell cheaper than formerly, and such prices as £140 for copper and £160 for tin will probably never occur again in the present generation, and if the price of the raw material can be bought so much cheaper, then the manufactured article ought to be had proportionately cheap. The first week of the new month opens under very unfavorable auspices, and presents no new feature whereby a better trade can be anticipated than that of the month just closed, and as that is considered to be the worst month that has been experienced this year, it affords anything but pleasing anticipations, but it is to be hoped that it will end well, and make good the deficiencies of the beginning."

London official Metal Exchange report: *Copper* steady; Chili bars, G. O. B., £67.5/ to £67.10/; picked brands, £68 to £68.10/ Australian firmer; Wallaroo, £80.10/ to £81. Business done in Burra at £74.5/ and £74.10/; English tough, £73 to £74; best select, £74.10/ to £75.10/; strong sheets, £79 to £80. *Tin* firm; small sales of Australian at £63.15/ to £64; Straits, £64.15/ to £65; English ingots, £68. 10/. to £70; Scotch pig-iron, 54/6, cash. *Lead* firm; English pig, £20.5/; soft Spanish, £19.15/ to £19. 17/6. *Spelter*, £19.2/ to £19.7/ for ordinary Silesian. *Quicksilver* weak at £8. *Antimony*, £48.

The latest Liverpool prices are:

Iron, f. o. b. in Liverpool, per ton.

	£ s. d.		£ s. d.
Merchant bar	6 5 0	to	6 10 0
" in Wales	5 15 0	to	6 0 0
Staffordshire	7 0 0	to	9 5 0
Hoop	7 10 0	to	8 10 0
Sheet	8 10 0	to	9 10 0
Nail rod	7 0 0	to	7 10 0
Bar, best crown	7 0 0	to	8 0 0
Boiler plates	9 0 0	to	10 0 0

Tin Plates, f. o. b. in Liverpool, per box.

	£. s. d.		£ s. d.
Charcoal, I. C	1 2 6	to	1 4 0
Coke, I. C	0 18 0	to	1 0 0

Copper, delivered in Liverpool, per ton.

	£ s. d.		£ s. d.
Bolt and sheathing	82 0 0	to	0 0 0
Tile	75 0 0	to	0 0 0
Tough cake	76 0 0	to	0 0 0
Best selected	77 0 0	to	0 0 0

The Board of Trade returns, to which extended reference is made above, show that the exports of the various metals to the United States in the month of August, and for the eight months ending Aug. 31, have been these:

	August.	Eight mo.
Unwrought Copper, cwts.	None	100
W't or manufactured ditto, cwts.	58	921
Tin Plates, tons	8413	70,270
Unwrought Tin, cwts.	2233	21,961
Gold	£340,600	£592,100
Silver	None.	£297,180

Our Export Trade.

In response to the trade circular recently transmitted from the Department of State to our consular officers, an interesting report on the prospects for an extension of American trade in Eastern, Southern and Central Germany has been received from the United States Consul General at Frankfort-on-the-Main.

After fully reviewing the obstacles to the increase, such as the attachment of the German people to fixed customs and their disinclination to accept innovations which might imply a change of habits and the manner of doing things which have come down from generation to generation, the Consul-General feels assured that all such obstacles will readily yield to the great law of profit and pecuniary interest which governs commerce, and that the present time is peculiarly favorable for the introduction and sale of American productions in that part of Germany. The existing plethora of coin, the languishing state of production, and the low rates of duty prevailing, specially invite our producers and manufacturers to find a profitable market there.

The best and surest way to command this extension of trade, in the opinion of the Consul-General, would be by the establishment of a central depot at Frankfort, where American goods and manufactures would be constantly on exhibition, this permanent depot or exhibition to be attended by responsible agents, men of strict integrity and financial responsibility, to solicit sales and carry out all the rules necessary to the full success of any active and legitimate enterprise. A compliance with these rules, and an accommodating spirit toward the peculiarities of the people and their requirements, cannot but lead to a large and profitable increase in American trade with that important part of the German Empire. The very friendly feeling which prevails among the people toward the United States will greatly facilitate all commercial relations between the two nations.

The following comes by telegraph from Washington, under date of Sept. 26th:

Heretofore the United States has been the great market for European manufactures, but this order of things is being suddenly reversed, for not only are American manufacturers driving European manufacturers out of our own markets, but they have begun to compete most successfully with European manufactures in the European markets. A single instance reported to the Department of State by the United States Consul at Amsterdam is that of the house of Daniel Loeb, which has largely exported leather, principally tanned calf skins, to the United States. The consul, noticing the cessation of these exports, called upon the senior partner for an explanation. The answer was: "We are no longer exporters; we now import from the United States. Affairs in Europe are about being turned topsy-turvy by the Yankees." He added that not only did they import leather from the United States, but that they had also begun to import New England shoes, and that European manufacturers cannot compete either in price or quality with the Americans. The house has recently sent a large order to New England for shoes, and the junior partner was about leaving for the United States to perfect and enlarge their business relations.

The two spans of the great bridge across the Missouri at Council Bluffs which were swept away August 25th, were rebuilt and ready for the passage of trains Sept. 16th. The two spans were two hundred and fifty feet in length, composed of four trusses, and the actual work was done in about two weeks' time. This, says the *Railway Age*, is probably the most rapid feat of bridge building, considering its character, ever accomplished, and shows the speed which has been reached in constructive art, as well as the executive ability in railway management which decides quickly and acts promptly in cases of emergencies.

Workingmen's Co-operative Works.

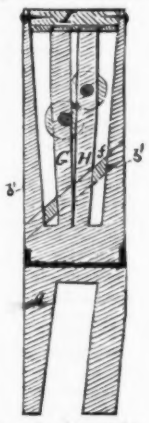
Some time since we referred to a movement among certain workingmen, chiefly in Western Pennsylvania and Eastern Ohio, looking to the establishment of a co-operative works on a large scale. The association formed has just closed the articles of agreement for a 99 years' lease of what is known as the Gauley property, in West Virginia. It is on Bell Creek, Fayette county, and comprises 12,500 acres. The consideration is a royalty of 10 cents per ton on ore and 6 cents on coal; free sites for blast furnaces, foundries, rolling mills, glass houses, dwellings, &c.; petroleum is to pay the owners one-tenth royalty, and should salt or other articles be developed, whatever may be customary is to be the royalty. It is the intention to construct a narrow gauge railway to Gauley Falls, which will be the head of navigation. This road will cross the river about two miles from the property on a bridge yet to be built, but which will cost but little over the labor of construction, as the Baltimore and Ohio Railroad Company proposes to assist, and Gen. Imboden assures the association that a sufficient quantity of cut stone for the structure, belonging to the State, which was prepared for a bridge at that point, will be donated. The association has also secured the lease for five years of the coal property known as Hawk's Nest. This vein is 11 feet, and can be approached by five or six entries if necessary, and admits of almost any number of rooms. The agent of the owner is to expend at once $4000 in getting the mine in good working order, and it is thought that some of the stockholders may have a chance to show how much coal they can get out *per diem* in two or three weeks. A narrow gauge, with tipple, locomotive and rolling stock leads from the Hawk's Nest works (3½ miles) to the Chesapeake and Ohio Railway, over which shipments can be made East and West. Some of the men connected with the scheme are good workmen, and others have good executive ability, and the result of the effort will be watched with interest not only by workingmen but by employers. It will have the difficulties inherent in all co-operative schemes to contend with, but it has a promise of success if it can subordinate these to the general good.

New Patents.

We take the following abstract of new patents, recently issued, from the official record:

CLOTHES-WRINGER.

To Alfred E. Cooke, Baltimore, Md.—Aug. 14.—The standards are slitted to form elastic journal-supporting strips, on each side of which slitted part the wood is cut out to permit separation of the strips forming the slitted center part, and these strips are bored to receive the journals of the wringer rolls, the upper ends of said strips being left free to vibrate in a transverse slot on the under side of a top piece extending above the rollers from standard to standard.

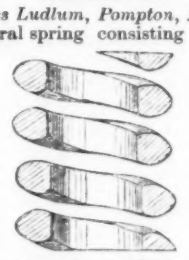


1. The standards A A, having the spring-strips G H secured to the standards at their lower ends, and having their upper extremities free to vibrate, in combination with the rolls B C, journaled in said strips, and with the parts b^1 b^1 and I.

2. The standards A A, having elastic strips G H, in combination with rolls B C, posts b^1 b^1, top I, and drip-board *f*.

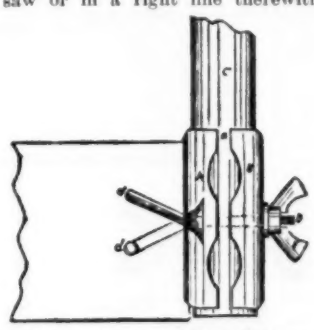
SPIRAL SPRING.

To James Ludlum, Pompton, N. J.—Aug. 14.—A spiral spring consisting of a coiled steel bar having convex sides and flattened on one of its edges.



CROSSCUT-SAW HANDLE.

To C. A. Root, Andover, Ohio.—Aug. 14.—The handle is attached to the saw, so that it may be used at right angles to the sides of the saw or in a right line therewith, by means of two clamping-plates, the inner one having a longitudinal and transverse groove, a bifurcated bolt hooking into holes in the saw-blade, and a thumb-nut for securing the whole in position.

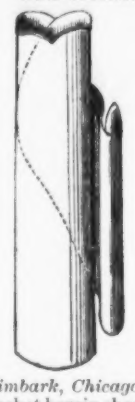


1. The clamp-plates or sections A and B, provided with the longitudinal and transverse grooves *m* and *n*.

2. In combination with the bifurcated bolt D and nut, sections A and B, handle C, and saw F, the spring G.

3. The adjustable saw-handle herein described, consisting of section or clamp-plates A B, provided with the transverse and longitudinal grooves *m n*, bifurcated bolt D and nut, in combination with the saw.

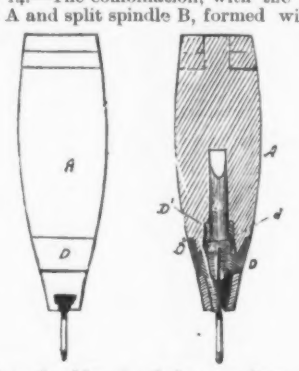
WHIP-SOCKET.



To D. A. Kimbark, Chicago, Ill.—Aug. 14.—The whip-socket herein shown is constructed from a thin sheet of elastic metal.

AWL-HAFT.

To M. A. Bartlett, Worcester, Mass.—Aug. 14.—The combination, with the wood body A and split spindle B, formed with an offset or shoulder, *b*, of the re-enforce piece D, having central projection D^1, internally shouldered at *d*, and outer rim or flange D^2, for embracing the wood.



The Fire in the Patent Office.

A careful investigation of the results of the fire at the Patent Office shows that the loss is not so great as was at first apprehended. Out of the 182,000 models contained in the model room, about 10,000 were destroyed. All of these were valuable. Those not of intrinsic worth, as entering into patent litigation, were valuable as curiosities. The rejected models, numbering 20,000, were entirely destroyed. The classes were of harvesters, agricultural implements of all descriptions, and all relating to railroads, hydraulics and pneumatics of every kind and description, and several other minor classes, including many models of considerable importance. All the models in the fine arts and lines of building, hardware, printing and sewing machines, including the original Howe sewing machine, were saved. The original model of the cotton gin, which first made cotton a product of profitable agricultural industry, was destroyed.

The value of property destroyed in the abstract will aggregate $1,500,000, but as a large class of the models cannot and will not be replaced, the actual loss will probably not reach over $800,000 or $900,000. The Patent Office has to its credit with the Treasury of the United States, over and above its earnings, a sum sufficient to meet this expenditure, but it cannot be used without an appropriation by Congress.

About say ten per cent. of the models destroyed were valuable as evidence in patent cases, ranging from $50 to $100, according to the significance of the case in which they would form an essential feature of evidence. Some few of these may and will be reproduced by the department where the drawings are sufficiently complete to admit of it. The very fact of the loss of these models will give rise to endless litigations, and where they would become valuable is in determining claims to improvements in important inventions, which will be made and litigated simply because the models are lost and thus a very vital piece of evidence destroyed.

It should be borne in mind, however, that the loss of a model does not in any way affect the rights of a patentee, as the model is really no evidence of the validity of a patent; but their destruction is damaging, for the reasons above stated.

District Commissioner Bryan went to the Patent Office in company with Commissioner Dennison, to ask the officials there to employ such laboring men as may be recommended by the Labor Exchange in the removal of the rubbish, debris, &c., about the Patent Office. They were informed that so far such laboring men had been so employed, and would continue to be until the work of righting things is completed.

Steamship Line between New Orleans and South America.—The *Globe-Democrat* says: The steamer Chiswick will sail October 1 from New Orleans to the following ports: Laguaira, Porto Cabello, Rio Hache, Sa Canilla and Aspinwall. This is the first of a line of three steamers for that trade, and the success of the first will insure the permanency of this line. If freight in sufficient quantities should offer hereafter, the trips will be more extended, taking in Trinidad, the Guianas and the important Brazilian ports of Pernambuco, Bahia and Rio de Janeiro. Mr. Hugh O'Donnel, the representative of Mr. H. T. Lawler, the agent for this steamer line at New Orleans, is now in the city, soliciting some 5000 barrels of flour to make up the cargo. So far half that amount has been engaged, and to secure the balance the President of the St. Louis Millers' Association calls a meeting, after 'Change of the millers, for the purpose of unanimous action in subscribing the needed cargo. There is not a person in this city who is not fully impressed with the importance of this enterprise. It has been discussed for years. Now the time for action has come. Millers or manufacturers who first get their foothold will keep it. People in those countries are hard to change. Any trade-mark from the United States, once accepted, we think will hold its own against all future introductions.

Treating Ferruginous Sand.

It is well known that there are certain iron ores and residuary oxides of iron which from their being in a state of minute division, it has hitherto been found very difficult to smelt or otherwise utilize. Among ores or oxides of the class referred to are the ironsands of Taranaki and Canada, some hematite ores, and what is known as "purple ore" the last named being a residuum of what is known as the "wet" process of treating iron and copper pyrites. The London *Mining Journal* says: To overcome these difficulties Mr. Robert Main, of the Carnbroe Iron Works, Coatbridge, has patented an invention which consists in mixing iron ores or oxides of the kind referred to with blackband or clayband, or other ironstone, and in calcining the mixture in the manner ordinarily practiced with the ironstone alone, or in any other suitable manner, prior to putting it into the blast-furnace.

In carrying out the invention when adopting the ordinary open heap or open hearth method of calcining the ironstone, a suitable proportion of the finely divided iron ore or oxide is roughly mixed with the ironstone and with the necessary proportion of coal. In the case of clayband ironstone calcined on the open hearth, the proportions found convenient in practice are one hutch of the fine ore or oxide for every six hutches of the ironstone. In the case of clayband ironstone calcined in running kilns, there should be one hutch of the fine ore or oxide for every twenty of the ironstone. In the case of blackband and ironstone calcined on the open hearth, there may be one hutch of the fine ore or oxide for every three or four of the ironstone. In most cases the proportion of coal to the total iron should be increased to an extent that is easily ascertained on trial. The mixing may be sufficiently effected by scattering the fine ore or oxide over the ironstone with spades or shovels, the contents of the hutches being deposited in regular order, according to the proportions adopted.

During the calcination of the heap, the finely divided ore or oxide being raised to a high temperature becomes agglutinated and formed into lumps suitable for charging along with the calcined ironstone into the smelting furnace. By the process described the purple ore or similar oxide becomes freed from the large percentage of water usually adhering to it, and much of the sulphur, arsenic, and copper associated with it is volatilized, so that the quality of the iron obtained is improved.

Burning of a Wire Mill.—The annealing and coarse wire mill of the Spencer Wire Company, at Spencer, Mass., was burned on the morning of September 25th. The loss is $5000.

Urbain Joseph Le Verrier, the famous astronomer, died in Paris on the 23d of September. He was born in Sainte Lo, March 11, 1811. After graduating at the Polytechnic School he entered the Government Tobacco Bureau, in order to remain in Paris and have leisure and facilities for the study of science. He at first devoted himself to chemistry, but soon yielded to his preference for mathematics. Obtaining a small post in the Polytechnic school, he speedily became an authority on speculative astronomy, and a bosom friend of Arago. His first important writings were submitted to the Acadmy of Science in 1839, and he was elected a member in 1846. In that year he discovered a new planet by elaborate calculation. This planet, now known as Neptune, was at first named Le Verrier by Arago. Honors showered upon him from all sides. In 1849 he entered the Legislative Assembly, acted and voted with the Bonapartists, and after the *coup d'etat* of 1852 was named successively Senator and Inspector-General of Public Instruction. Arago dying in 1853, he became Director of the Observatory. In 1859 he thought he had demonstrated the existence of another planet, but it has not as yet been found. In 1861 he published a remarkable paper on the planetary system, and the "theory and tables" of Mars, which he partially retracted in 1872, just before his reappointment to the Directorship of the Observatory, which post he had lost two years before in consequence of protracted and bitter quarrels with brother astronomers. In addition to his many other titles, he was a grand officer of the Legion of Honor.

The Paterson, N. J., *Weekly Press*, speaking of the locomotive building industry of Paterson, says: Although nothing in the way of new orders has been received at the Rogers locomotive shops as yet—that is, additional to what we have already announced—still there is not the slightest doubt that the prospect is more cheering and that ere long there will be a genuine, though perhaps not, for a time at least, a great revival of that important industry. There was a rumor—or rather more than that—to the effect that the Rogers Works were to have a renewal of a very considerable order, which was rescinded upon the approach of the hard times. We learn that this is still in abeyance. Meantime these works are busy on the boilers of those engines they were recently ordered to build for Missouri and other roads, and also on the second one for the Wallkill Valley Railway. Danforth's have received as yet but a portion of the material from Pittsburgh for the boilers—the first part constructed—of those engines for the Erie. The wheels of all the industries connected with the locomotive building craft have been so long partially idle that the aforetime promptness in procuring all manner of material cannot now be expected.

The contract for the new round house of the Pennsylvania Railroad, to take the place of the one destroyed during the riot, has been given to Messrs. D. W. C. Carroll & Co., of Pittsburgh. The roof is to be of iron iron-trussed.

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DESCRIPTION OF THE SEVERAL PARTS.

THE SCROLL SAW.

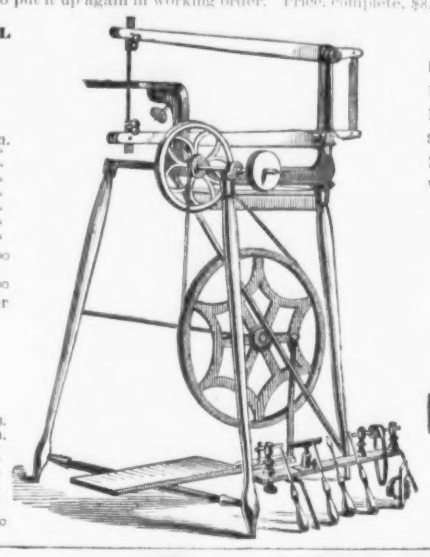
Length of arms	20½ in.
Length of sweep for work	17 "
Height of table above floor	31 "
Diameter of table	6 "
Length of stroke	1½ "
Diameter of driving wheel	12 "
Diameter of balance wheel	6⅝ "
Diameter of emery wheel	3½ "
Number of strokes of saw per minute	1,000
Number of revolutions of emery wheel per minute	1,000

These speeds are made with a tread of 150 per minute.

Weight of Scroll Saw, 30 lbs.

THE LATHE.

Weight	6¼ lbs.
Length of ways over all	15¾ in.
Distance between centers	9 "
Swing	3 "
Length of slide rest	4½ "
Height of head and tail stocks above ways	2½ "
Diameter of cone pulley	1¼ "
Number of revolutions per minute	7,000



THE CIRCULAR SAW.

Diameter of saw	½ in
Length of saw arbor	2¼ "
Height from floor to table	33 "
Size of table	4x5½ "
Number of revolutions per minute	7,000
Weight	½ lb.

Total Weight of Combination, 36 3-4 lbs.

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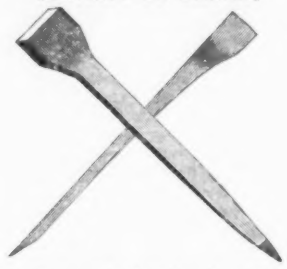

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Mr. Stetson represented Messrs. Fairbanks in extending the Railroad Track Scale Patent, Sir William Thompson in patenting the Atlantic Telegraph Instrument, and Mr. Corliss in patenting the novelties in the Centennial Exhibition Engine.

PATENTS.

F. A. LEHMANN, Solicitor of Patents, Washington, D. C. No Patent, No Pay. Send for circular.

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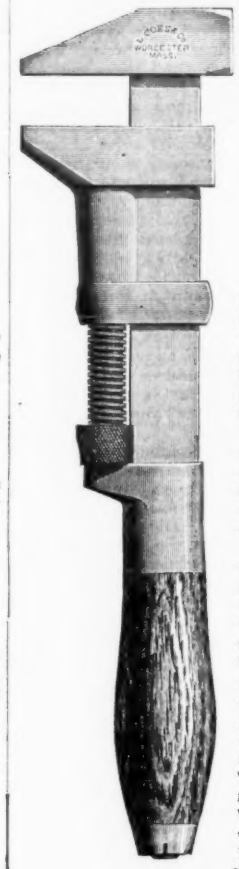

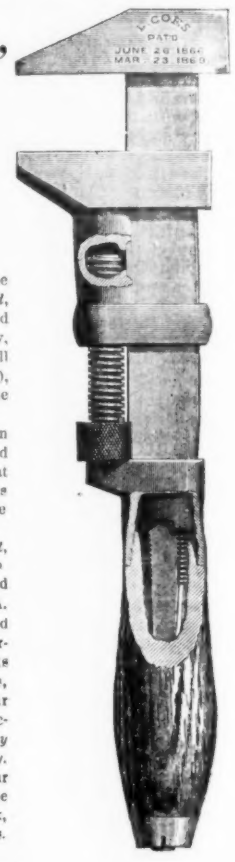

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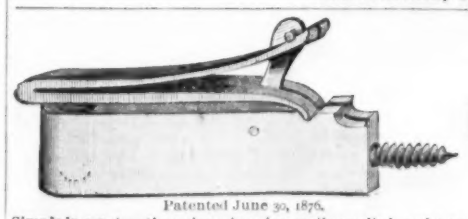

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The Present State of Industrial Art.*

BY CHARLES L. EASTLAKE.

The immense importance of the subject of industrial art to all who are engaged in the manufacture of anything to which decoration can be applied, and the great interest felt in this country in everything coming from Mr. Eastlake's pen, renders the following article upon the subject of the present state of industrial art exceedingly interesting:

We have been in the habit for two or three generations past of dividing art into several sections, and of giving them grand names. There is high art, for instance, and fine art and pictorial art and textile art and ceramic art and industrial art and what not, and of these some have been foolishly overrated on sentimental grounds, and others have been foolishly underrated on ignorant grounds; and the most curious fact is that all these fine names were invented or adopted during a period when taste in all art had sunk in this country to the lowest standard which perhaps it has ever reached since civilization began. I mean in the early part of the present century. Of course, in saying this, I except such noble instances of artistic power as Turner, Flaxman and others whose genius shone like stars in the surrounding darkness, but the full excellence of even their work has only lately been appreciated as it should be, while the minor arts, as we are pleased to call them, were clean forgotten in those days or regarded as mechanical and unimportant. Amid all the tall talk about the grand schools of painting and sculpture, amid all the foggy theories and pompous dissertations which were imported from Germany about this and that style, and in spite of *dilettante* clubs and learned societies, the arts of manufacture sank lower and lower in character of design, and as a matter of consequence in quality of execution. For you may take it as a fact that, speaking generally, the worst taste in manufacture is generally found in articles of flimsy workmanship, and the best taste in those of sound, honest handicraft, all the world over.

The truth is, that while connoisseurs were theorizing about the old masters, while *virtuosi* were examining Greek vases and puzzling their heads to fix the precise period at which each was made, it never seems to have occurred to them that their time might have been better employed in encouraging the art of their own day.

Now don't let me be misunderstood on this point. No one has a greater reverence and admiration for ancient art than I have, and I only wish that all who hear me at this moment could spend their Saturday afternoons alternately at the National Gallery and the South Kensington Museum, both of which contain priceless treasures that cannot be examined too often or too carefully; but do remember this, that no centuries of time can ever add to the merit or detract from the excellence of those works. Those which are admirable now are to be admired, not because of their age or associations, however much our interest may be enhanced on that score—but on account of the skill displayed in their design and execution—just as they stood on the painter's easel, or were displayed in the potter's shop, or were carried away from the blacksmith's forge. There were degrees of excellence then as now, and of course some failures, and when we see and recognize them, whether in a picture frame or a cabinet, we should have the courage to say so, whatever their antiquity may be.

Now the connoisseurs of our grandfather's time talked a vast deal about the classic school of landscape painting, about composition and chiaroscuro, and Heaven knows what besides, but they let two of the greatest landscape painters the world has seen—William Turner and David Cox—work for years without finding out their merits.

The moral which we may draw from all this is, I fancy, plain enough. If a genuine love of art exists at any time it will be found to extend forward as well as backward—in other words, it will encourage excellence in contemporary work and not content itself with hoarding up examples of a bygone age for the mere sake of their rarity, or what I fear is too frequently the case, for the sake of their market value.

Further, I may say that a genuine love of art, whether in a nation or as an individual characteristic, should represent something more than the wealth of a museum or the pride of a collector. It should reach and invest with interest the home of every householder, however humble, throughout the land. One of the greatest historians of our time, Lord Macaulay, in the first pages of his greatest work, made scornful allusion to that absurd phrase, "the dignity of history," and pointed out that a history which did not include some notice of the domestic life of our ancestors would be no history at all. Now I think there is an equally absurd phrase, which is of recent origin and which is equally open to ridicule, and that is the "dignity of art." That expression, as commonly understood, means this—that art is a luxury which can only be enjoyed by the wealthy and highly cultivated; that it is the special property of the collector or the *savant;* that those who cannot afford to buy expensive pictures or rare specimens of bric-a-brac must be content with ugly houses and commonplace furniture. This melancholy and selfish creed is, I hope, dying out in our country; but depend upon this, that while a vestige of it remains there will be little chance of improvement in really national taste. It is precisely because art has been looked on in this light, and talked of as something beyond the reach and appreciation of the people, that the people have grown indifferent to it, and have come to regard it as a thing of the past, the traditions of which are preserved by the world of fashion like armorial bearings or a footman's livery.

Now of course it is very difficult for us in these days to ascertain how far the working classes of any nation in bygone times enjoyed the highest and most refined achievements of art; but one thing is certain, that down to the end of the seventeenth century the difference between what we now call "high art" and the ordinary arts of manufacture was only a difference of degree and quality—not one of style. The houses of the wealthy in those days were, of course, furnished with articles of costly material and elaborate workmanship, which were beyond the reach of humbler citizens, but the mode and manner of their execution was the same throughout the land, and the consistency of taste prevaded all the arts, from architecture down to the mere fashion of dress. How the change came about which we recognize in the present day; how the line came to be drawn between high art in some quarters, and no art at all in others, is a very complex question, which to investigate thoroughly would involve considerations beyond the scope of this lecture. It may, however, be well to point out that among the causes which have led to this result are the progress of education and the rapid increase of wealth, which have taken place within the last century.

* * *

In former ages, as you know, the habits of the working-classes were far simpler and more domesticated than they are at the present day. Men, who in country towns and villages plied their trade as joiners, weavers, blacksmiths, or what not, were content to work as their fathers and grandfathers did before them, and generally brought up one or more of their sons to the same business. In this way the traditions of their craft, whether in regard to design, technical knowledge of material, or method of work were preserved, and as all these improved with experience, you may suppose that the result was most beneficial to every branch of industrial art. But by and by many changes came about. Railroads were laid down; schools were set up; cheap newspapers were circulated; some of these honest folks began to get ambitious; they traveled, they read the papers, they sent their boys to school. All this cost money, and the consequence was they were obliged to do more work in the same time. Of course work was hurried, and not so well done. The sons of these men, being better educated than their fathers, began to grow conceited, and to look down upon their fathers' work. Sometimes they went off to "better themselves," as the phrase is, and were replaced by journeymen, who being paid by the day, and having no interest in the business, naturally thought more of their wages than their work, and moved from place to place whenever they saw a prospect of higher pay, leaving the work to fresh and inexperienced hands. Nor was this all. As work went on increasing, for the sake of wage, population went on increasing too, and unfortunately at a far greater rate than money. Provisions, clothes, and many of the essentials of life became dearer. More work became necessary to pay for them, and at length masters themselves began to consider how they could execute the same amount of work with less trouble, or a greater amount of work at a cheaper rate.

The result of all this, as you may suppose, was to substitute an inferior class of handicraft and material. Cast iron took the place of wrought. In joinery, moldings, instead of being worked in the solid, were run out by machinery and planted on. Common druggets were printed in imitation of woven carpets. Brickwork was "scamped," and plastered over with stucco or cement in imitation of stone. Deal was grained in imitation of oak or marble. Crockery, which had been formerly painted by hand, was decorated with printed patterns. Much of this work and many of these articles being of course cheaper than what had formerly been produced, suited the pockets of pretentious people, who like to make a show at a small cost; and the consequence was a gradual increase of demand for what I will venture to call cheap and nasty work, and a neglect of those honest trades which were once the pride of the British workman.

The traditions of some few, indeed, have survived, probably because no shams could possibly be practiced in them without at once rendering the objects produced useless for their purpose. To this day I know no specimen of native manufacture more satisfactory in construction and more picturesque in appearance than a rustic cart. It is always solidly made of stout timber and well hammered iron. Such little graces of decoration as its purpose admits, in the way of turned woodwork, chamfered edges, or applied color, are simple and unaffected. It serves its object well and honestly, and has fillen the page of many an artist's sketch book. And yet the maker of that cart may perhaps have never learned to read or write, and knows no more of industrial art than he does of the Differential Calculus. That is the kind of work which we should try and revive in this country; that is the kind of work which no school of design can improve.

Pray don't suppose that I am putting an extreme case, or that I wish to say a word in disparagement of this and many other excellent institutions which have become a necessity at the present time. All I desire to point out is that their object should be to start from the principles which guided our forefathers in design and construction. When we have mastered those principles and learned to work well and thoroughly in any one style of a bygone age, it will be time enough to think of inventing a new style, about which ignorant people often talk, and with as much reason as if they proposed to invent a new language.

Take, for instance, the noble decorative art of Japan as it has been applied for centuries past to the design of pottery, of lacquered work, and of textile fabrics. That is something like industrial art, if you will, and what is the secret of its excellence? It is traditional work handed down from generation to generation, with infinite varieties of form and color it is true, but with no change of style in the ordinary acceptation of the word.

Now, mark what has happened. The progress of civilization goes on. Commercial enterprise and increased facilities of travel afford opportunities of intercommunication between Europe and the East. Japanese goods are brought to the English market, and specimens of British manufacture go to Japan. All very satisfactory in the interests of trade no doubt, but meanwhile the Japanese artist, after examining the work produced by this great and enlightened English nation, and perhaps getting a hint or two from our merchants, comes to the conclusion that he had better modify his taste to suit our notions of elegance, and the result for years past has been a gradual deterioration of Japanese art.

This is a melancholy state of things, for which it would be difficult, if not impossible, to devise a remedy, and if I dwell upon it it is to show you the fallacy of supposing, as many excellent and well-meaning persons do, that the progress of good taste in manufacture must necessarily go hand in hand with what used to be called the march of intellect. The very fact that we have learned so much, that we have brought before us so constantly at international exhibitions, and by means of published works, specimens of the art of other nations, puzzles the designer as to choice of style, and makes him borrow a hint from this and a trick from that school of taste. Conditions of form and schemes of color, which properly belong to one branch of manufacture, are too often imported into another, and we may congratulate ourselves if the result is not a hopeless jumble of ill-assorted materials, misapplied ornament, and inappropriate construction.

How can we escape from these difficulties? It is easy to say, "Go to the South Kensington Museum and study the lent examples of ancient art." But I cannot fancy a more bewildering task for the student—I am speaking of beginners of course—than to wander through that palace of countless treasures, including specimens—good, bad and indifferent—of every age and nation, in the hope of improving his taste. It is true that he may join the schools and study types of ornament, but the study of ornament in the abstract, and without an adequate knowledge of the mode in which that ornament should be applied, may teach him to draw indeed, but will never teach him to design. I would rather say—make up your mind to study one branch of manufacture at one time and ascertain, as you may easily do, the best period and most notable country for that manufacture.

Choose the simplest objects first, and draw them (I assume that the student has learned to draw) geometrically, giving an accurate profile of every vase or casket, mapping out the ornament on its surface, and making memoranda of any color decoration. In furniture and metal work examine carefully the construction of the objects, and plan it, where possible to show every joint or rivet. Make full sized sections of the moldings, and figure every dimension on the spot. In examining old stained glass note the disposition of the lead lines, and in woven fabrics the direction of the threads, with as much care as you bestow on the figures or patterns themselves. Studies such as these will be of more value for future reference and of far more help toward mastering the proportions of design and technical details of manufacture than any perspective sketches however elaborate.

In selecting objects of ancient manufacture for this kind of study, I would strongly advise you to choose those which in some form or other are still serviceable under the conditions of modern life. No doubt in many instances they may not be so attractive or interesting as others whose purpose has become absolete, and the very quaintness of old-fashioned articles, reminding us of the habits of our forefathers, will invest them with a certain charm which it is difficult to resist. But after all, if our object be to improve the taste of modern industrial art, it seems waste of time to perpetuate types of form which are alien to the necessities of our own day. By and by no doubt you will be able to glean hints for decorative design from such objects which may be usefully transferred to those of every-day use; but speaking generally, and especially to beginners, I would recommend you first to confine your studies to that class of articles which a shopkeeper would find salable if reproduced for the modern household.

There are hundreds of such articles now exhibited in our museums, and it has always been a matter of astonishment to me that manufacturers who, at a trifling cost, might provide themselves with models or drawings of these objects for imitation, prefer to bring out, year after year, what they call "novelties," and which, while departing widely from ordinary types of form recognized by custom, are far from realizing the grace of ancient art. Some few years ago I lent the proprietor of a well-known china shop a pretty example of old Italian majolica for table use, which I thought might be reproduced at a moderate cost. The design was picturesque and good of its kind, and the China merchant was delighted with it. Well, this piece of majolica—it was a salt-cellar—was sent down to the potteries to be copied, and after waiting some weeks I called to see whether the model had arrived. The China merchant said he was very sorry, but there was always a little delay about these matters. It had not yet been put in hand, but he would write about it. He did so, and I waited for several weeks more. At last I called again, but it was not ready. More letters passed, and at the end of six months the model arrived, very correctly imitated in form, but with a plain white glaze on the ware. The pretty Arabesque pattern on its surface had not been added. I had to wait three months more for that, and when the salt-cellar came from the potteries I found that the local artist had tried to improve upon the original by shading up the ornament in a modern fashion, quite different from the original. Well, I said this would not do for me. I wanted the decoration copied line for line. Back to the potteries went the salt-cellar, and I had to wait three months more. At length, after exactly a year had elapsed from the time this piece of majolica left my house, I obtained a very faithful copy of it, and congratulated myself on having helped to revive a good design. But on inquiring the price I found that each copy would cost about four or five guineas. I had given as many shillings for the original in Italy. Now whether it was due to the costliness of the reproduction or the caprice of the manufacturer I do not know, but certain it is that although I have frequently visited the shop since I have never seen this reproduction offered for sale, and I might just as well have never troubled myself about the matter. Observe that this was not a question of much difficulty, nor need it have been one of much cost. The French would readily have reproduced the article in their Gien ware, and at a third of the price. Indeed, every season I see in the same shop articles requiring quite as much care in production, with surface patterns far more elaborate, but they are novelties of nineteenth century design, and for some mysterious reason are preferred both by the British manufacturer and the British salesman to any copy of ancient art.

I do not say that this infatuation extends to all branches of manufacture. In cabinet work, for instance, there has been a marked improvement of late years. The coarse carving and lumpy machine-made ornament which disgraced our furniture some twenty or thirty years ago, are being gradually replaced by delicate moldings and graceful inlay. Hand polish is taking the place of heavy varnish. English oak, American wal nut and ebonized mahogany are extensively used, and often with great success, in the design of sideboards, mantelpieces, wardrobes, chairs and tables. Many of these articles, although designed, and with good reason, to suit the requirements of modern life, recall some of the graces of ancient woodwork. There is indeed a tendency to prettify them unnecessarily, and especially when colored decoration is introduced, in panels, etc., the design is apt to be restless and fussy in character; but on the whole these examples of furniture are picturesque, and often exhibit evidence of an educated taste which was unknown in the last generation.

In curtain stuffs and printed goods there has been a still greater advance as to quality of design, and this in regard not only to the form of pattern but to the scheme of color adopted. Dyes and subtle combinations of tint are produced which would have been pronounced impossible a quarter of a century ago, and which if produced the great authorities on color would probably have scorned. For there were wonderful theories extant in those days about chromatic scales and the proper proportion of primaries to tertiaries and complementary tints; and a general impression seemed to exist among the learned that the art of decorating in color was something which you could work out by arithmetic. If a designer truly loves color his eye will always be in search of it, and by degrees he will learn almost instinctively why such and such combinations are harmonious and pleasing, while others are crude and unsatisfactory. In that and every other branch of design it is well to bear this rule in mind, that whenever you have to judge between two distinct kinds of effect, one depending on extravagance of form and startling contrasts and the other on delicacy of outline and sober hues, you will generally be right toerr on the side of moderation. Very clever designers, by dint of long experience, learn the art of surprising agreebly, but all surprises are not agreeable; and just as every sensible man is won more by quiet argument than by vulgur rant, so most of us will, I think, prefer temperate to restless decoration. While on the subject of color, I cannot help saying that the more I study its effect and value, whether in pictorial or decorative art, the more convinced I am that its application will be found most harmonious in instances where one dominant hue is found to which all others are subordinate. You have all heard of that famous picture, Gainsborough's Blue Boy, which is the delight of every painter and connoisseur. Now why has this portrait such extraordinary attraction? Chiefly, I venture to think, because it has this quality of chromatic unity. You recognize it at once as a blue picture. I don't mean that it is all indigo or cobalt, or French blue, or Prussian blue. It may pass from one to another of these shades, and include gray, white and green. You may get warmer hues of pink and brown in the flesh tints and background, by way of delicate contrast, but the prevailing tone is definitely blue.

Well, I think that our rooms should be decorated on this principle, not in the upholsterer's sense of harmony by covering all his furniture with stuff cut from the same piece, and by hanging up curtains to match, but by making one color dominant and ringing a variety of changes on it. In this way yellow might lead up to green, silver gray up to purple, and Venetian red up to brown, but the subordinate tints in each case should have a certain affinity to the dominant color, and when you have settled all this you will find that any little bit of contrast introduced, provided it be unobtrusive and does not interfere with your scheme, will have a cheerful rather than a discordant effect. And this principle concerning the decoration of a room may be safely applied, I think, to all departments of design in which the element of color is a leading feature; as, for instance, in textile fabrics, paper-hangings and the surface patterns of pottery and china. Wherever you find two or more colors introduced in such even proportions that you are puzzled to know which rules, so to speak, be sure the design is bad.

In the three branches of design which I have just mentioned, a great change has taken place within the last few years, as no doubt many of you have noticed. I mean the substitution of natural forms of ornament chiefly borrowed from vegetable life, for the geometrical patterns and diapers which were once in vogue. This change is no doubt due to a reaction in architectural taste from mediæval types to those which prevailed during the seventeenth and eighteenth centuries. I have not time to go into this question of architectural taste now, and indeed it would be beyond the purpose and scope of my lecture, but it is quite certain that this change has taken place, and that it is gradually affecting the character of design in all branches of industrial art.

Now this will necessitate more than ever, on the part of designers, a study of natuarl forms in plants, animal life, and, indeed, of the human figure itself. In pursuing these studies I cannot remind you too emphatically that a literal imitation, or rather a literal representation, of natural forms has never in the best ages of art, and never will, constitute a good decorative design. To a certain extent every person who can lay claim to a taste at all admits this principle. A marble bust, painted up like wax-work, a group of dogs, after Landseer, depicted on a hearth-rug, or a shaded representation of a rose-tree on a paper-hanging, would at once be condemned as vulgar and ignorant by people who have had no artistic education at all. Well, then, the question arises how far, in the adaptation of natural forms to decorative purposes, you may go in the way of imitation consistently with good taste, and a very difficult question this is to answer in a definite way.

Perhaps the broadest and safest rule to follow in adapting natural forms to decorative purposes is to omit all expression of light and shade. I don't mean that you should be debarred from indicating, let us say, the rotundity of buds or fruit, for instance, by a few dark threads in textile work, or a few "hatched" lines in the design of a wall paper, but there would be no attempt to relieve one object against another, or to give an effect of distance by the opposition of light and dark colors, and above all, there should be no receding backgrounds or perspective in the pictorial sense of the word.

This rule is generally observed in the best curtain stuffs which are now designed, and to a great extent in the design of paper-hangings also, but I have often observed it violated in the case of mural decoration by tiles and *plaques*, where I think the introduction of chiaroscuro and perspective is a great mistake. It is true that we find authority for it in some periods of Italian art, just as we find authority in the Middle Ages for painting the internal stonework of our cathedrals with patterns from floor to roof; but these are instances when, if ever, we may appeal to the critical philosophy of modern taste for our guidance, and most modern critics who have given attention to the subject agree on this point.

Among other branches of industrial art there are three which deserve especial mention, viz., stained glass, ornamental metal work, and the manufacture of pottery and porcelain—each of which has within the present generation been marked by extraordinary improvement either in design or manufacture, though not to an equal extent in both. I have purposely refrained from mentioning names in this paper, but there are certain firms with whose work as glass-stainers you are all familiar, and who deserve the greatest credit for the high artistic excellence of their inventions. Personally, I think that academic accuracy in the delineation of the human figure is of small importance in a stained glass window, and for this reason: The very conditions of the art are not only removed from but opposed to pictorial treatment. In pictures, as Mr. Ruskin once deftly pointed out, the lights are opaque and the shadows transparent. In stained glass it is exactly the reverse. The highest light is the most transparent portion of the glass, and the darkest shadow is represented by that which is most obscure. In short, a stained glass window is less of a picture than a piece of tapestry. This being so, and inasmuch as in stained glass a judicious arrangement of color is the one essential for excellence, it seems unreasonable to hamper the design by the introduction of forms which prescribe any limit to that arrangement. One of the secrets of excellence in early glass was that the old designers made form entirely subservient to color. The quaint, angular outlines of ill-drawn figures lent themselves more readily to a free association of cunningly opposed tints than if the artist had been restricted by considerations of anatomy and perspective.

Apart, however, from this question, and accepting the fact that modern designers do aim at correctness of form in stained glass, I think we must all admit that many works of the present day do realize great beauty of color, and I for one entirely approve the spare use of positive tints, which may be reckoned among its characteristics, for nothing can be more destructive of effect in internal decoration than a flood of crudely variegated hues pouring in from a window.

In the design of ornamental metal-work there seems to be no lack of inventive power, and though, being chiefly used for ecclesiastical purposes, it generally assumes a mediæval form, efforts have been recently made to produce articles of domestic use which shall partake of a character more in unison with the latest phase of architectural taste. In point of execution it would be the better for a little more refinement in hammered work. Sheet metal might be used in many cases where castings are now employed, and if this should result in substituting a happy freedom of outline for the mechanical accuracy which still seems to be the ignoble aim of the modern workman, it will be all the better for the interests of art.

The revival of majolica ware is an incident in the history of British manufacture of which the present generation may well be proud. In quality of material and skill of manipulation it leaves little to be desired. It is, however, far more expensive than it need be, and this is because the artists employed in its decoration insist in finishing their work too highly. Old majolica, intended for domestic purposes, was not treated in this way, but sketched upon in a free and easy fashion, and though we find elaborately painted plates and dishes in our museums, they may be regarded as exceptions to the general rule—articles to be hung on a wall, as we hang water-color drawings now, and not destined for ordinary use.

The French in reviving this manufacture have had both objects in view; and while their more costly productions are of the kind I have mentioned, they also supply to the public a cheaper class of goods printed in imitation of Italian faience and old Rouen ware which, in point of design and price, we have not yet rivaled. English porcelain is perhaps the best in the world so far as quality of material is concerned, but the dinner and tea services which we see in our shop windows are still far from satisfactory in design, and the thick lustrous glaze with which they are covered is, to my mind, quite inconsistent with artistic excellence of effect.

I should like to have said something more on this subject as well as on the design of dinner plate and other fields for the exercise of "industrial art," but I fear I have already exceeded the limits of the time allotted to me, and perhaps too the limits of your patience.

In conclusion I will only record my conviction that a time has arrived when the public of this country are becoming sincerely interested in the progress of "household taste," and that it will rest with designers educated in this and other schools of the same kind to determine by their efforts the direction which that taste should take and the success by which its development may be attended.

* A lecture read before the Spitalfields School of Design on March 22, 1877.

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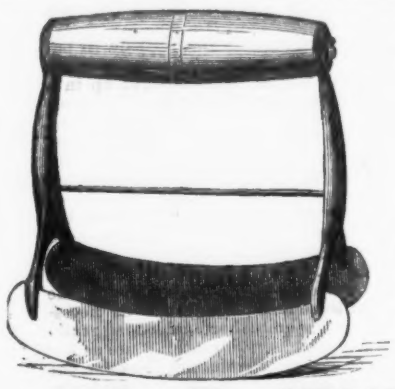

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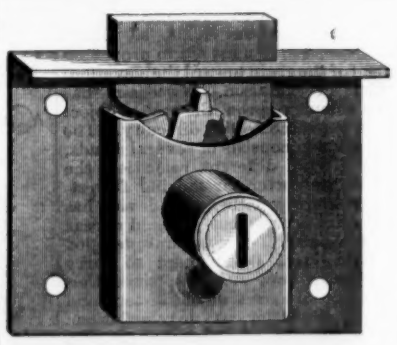

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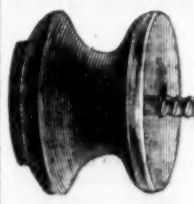

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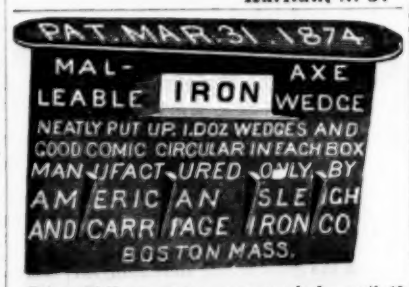

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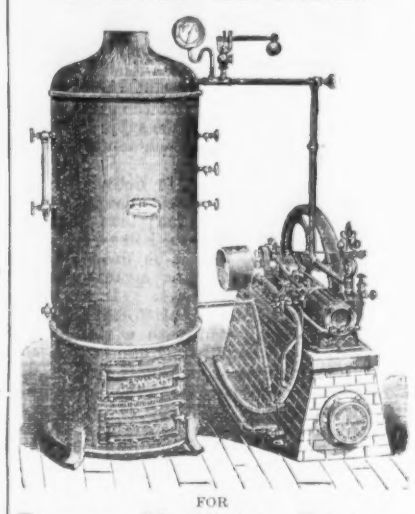

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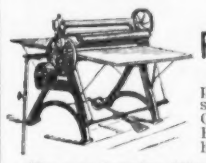

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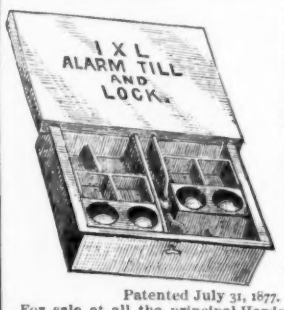

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BY EDWARD A. UEHLING, M. E.

(Continued.)

The delivering mechanism of a harvesting machine is that part which is designed to take care of the grain after it has been cut and collected upon the platform; it is constructed upon different mechanical principles, according to the manner and shape of the grain to be delivered. In discussing the subject we shall divide the delivering attachments into five different groups:

A. Attachments designed to deliver the grain in gavels to be bound, immediately, by workmen following the machine; the gavels not being delivered clear of the horse-track, these attachments are known as droppers. The dropper is the simplest attachment for delivering grain in gavels. It consists of a very light frame or platform, built of thin slats, so connected with a treadle that the driver can readily operate it with his foot. Its principle of motion is that of rotation about an axis parallel to the cutter-bar, through an angle sufficient to have it incline so as not to hold the cut grain, or so as to be able to let it slide off or drop, when enough for a sheaf has collected. The great points in favor of the dropper, are its cheapness and the ease with which it can be attached to machines originally designed for mowing only, and thus adapting them to reaping as well. There is, however, one serious disadvantage in using the dropper, which prevents it from being generally adopted, and that is, it does not deliver the gavel clear of the horse-track (see Fig. 1),

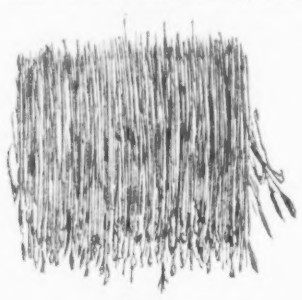

Fig. 1.

which makes it necessary to have a force of binders sufficient to bind the grain as fast as it is cut, or to stop the machine each round until the gavels have been cleared away. The former is not always possible, especially with farmers whose circumstances do not allow them a more complete machine, and the latter is very inconvenient and causes much delay.

B. Attachments designed to deliver the cut grain in gavels, clear of the horse-track, where they may be bound immediately, or left unbound as long as necessary or convenient. These attachments are known as rakes, and the machines upon which they are used are called "self-rakers." Rakes may be divided, according to their principles of action, into four distinct classes:

1st. Reel-rakes, revolving about a horizontal axis.

2d. Dorsey, or pigeon wing rakes—also generally called reel-rakes—revolving about a vertical axis.

3d. Table-rakes, reciprocating or revolving in the plane of the platform or table only.

4th. The Seymour, or New York type of rakes, reciprocating about two axis, one vertical the other horizontal.

Reel rakes.—Properly so called, because they are immediately connected to and revolve with the reel. Rakes of this class may vary greatly in detail of construction, but the principle of the motion is quite similar in all of them. The rake-head is fixed to one end of an arm, of sufficient strength, the other end of which is jointed to the reel shaft. The arm is guided by means of cams or other suitable mechanism, so that the rake-head is compelled to sweep through a portion of an arc in the plane of the platform sufficient to discharge the gavel. Motion is generally imparted to the rake and reel by means of a strong chain directly from the driving-wheel shaft.

As a consequence of the principle of construction, the rake sweeps over the platform at each revolution of the reel, whether much or little grain has been deposited there. Thus it is evident that the gavels will be of very irregular size, being large where the grain is heavy and small where it is light. This might be remedied to some degree by changing the speed, were it not for the fact that the reel and rake are just opposite in their requirement of change of speed; the reel requiring a faster motion in short and light grain for doing its best work, whereas the rake under the same conditions requires a reduced speed; an inverse opposition holds in heavy grain.

Good qualities of the reel-rake are, first, simplicity of construction; second, smoothness of motion; third, that by virtue of its principle of motion it enters the standing grain like a vane of the reel, and in passing directly over the cutter-bar it clears the platform perfectly at each stroke, and, lastly, it takes hold of the gavel in a line parallel to the cutter-bar and delivers it in form of a right-angled parallelogram (Fig. 6).

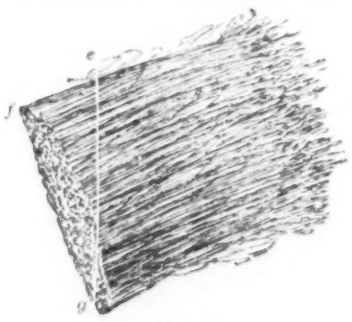

Fig. 6.

If the grain is heavy enough to insure a full sheaf at each revolution of the reel, it does excellent work; but this condition is not generally realized. Its greatest, and very probably fatal drawback, is that already noticed, viz., its dependence on motion of reel, rendering it absolutely uncontrollable. There are besides this several minor objections: First, that on account of the shaft around which it rotates being horizontal, the sweeping motion in the plane of the platform is limited to considerably less than a quadrant, taking the cutter-bar as one and the line where the rake leaves the gavel as the other limiting radius of the section swept over. In consequence of this the gavel, although of good shape, is not delivered far enough away from the standing grain, and one corner (*e f g*, Fig. 6) always projects into the horse-track.

The Dorsey Rake—More generally known as Johnston's reel-rake, being in fact reel and rake combined, and is so designed that it will perform both functions. The principle of this type of rake was first brought out by Mr. Dorsey in 1856, and is such as would be derived from an arm pivoted to an upright shaft, so guided by a fixed swash-plate or guide-curve, that the end of the arm, to which the rake-head is attached, shall move about a quadrant's distance in a horizontal plane. Employing four or more arms with a rake-head attached to each, and the perpendicular axis and guide-curve so adjusted that the motion in the horizontal plane shall set in when the rake-head had traversed the cutter-bar and continue to move in that plane through a quadrant's distance, then rise, we have substantially the principle of motion employed in all rakes of this type. Much ingenuity has been displayed in perfecting this form of rake, and a very large percentage of the more than 600 patents, issued for improvements on rakes, pertain to this class of delivering attachments. By virtue of the continuous motion about a vertical axis, the rake-head approaches the cutter-bar through the standing grain, at an angle continually decreasing from 90 to 0 deg., thus tending to throw the grain diagonally across the platform. This action generally goes on to an extent sufficient to cause the gavel to be delivered in form of an oblique-angled parallelogram (see Fig. 4), and the more so the taller and straighter the grain stands.

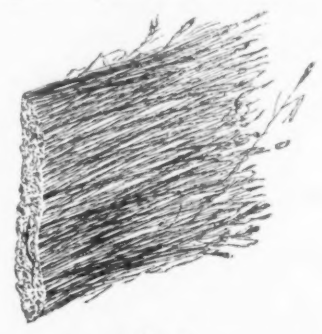

Fig. 4.

The advantages of the majority, though not all of the rakes of this class, are that they are easily controlled to a certain degree; by means of guide tracks and switches very easily regulated by the foot; either of the rakes may be caused to deliver a gavel, and that in consequence of each rake passing directly over the sickle, this is kept clear. Drawbacks to this class of rakes generally are—great complication and number of parts, consisting of guides, tracks, switches, springs, friction rollers, etc., and the oblique shape in which it delivers the gavels, making it difficult to bind them into well-formed sheaves.

Table-rakes.—The principle of motion of this type of rakes is entirely different from those already described, inasmuch as it moves only in one plane relative to the machine. The motion of the rake-head, which in this case bears more resemblance to a fork, is as follows: Beginning either at the divider shoe, as in Wood's, or near the driving wheel, as in the Empire and the Miller rakes, it moves practically parallel to the cutter-bar across the platform, carrying before it the cut grain and pressing it against the stay-board or circle-board, thence moving back in a straight line, as in Wood's, or in a circle, as in the Empire rake, to the rear end of the platform where the gavel is delivered. Good points about the table-rakes are: 1st, fewness of parts and durability; 2d, the ease with which they can be controlled; 3d, their delivering the gavel in a more compact form (see Figs. 3 and 5) than

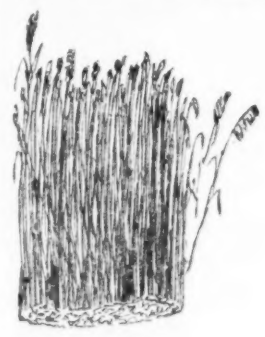

Fig. 3.

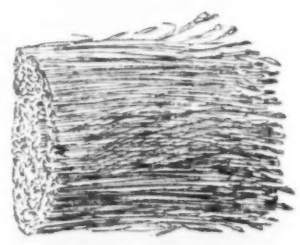

Fig. 5.

other rakes, saving labor in gathering the sheaves. The main objection to the table-rake is that it will not do as good work under unfavorable conditions as the other types of rakes. When the grain is long and entangled it will scatter more or less of it over the field, and if it is very short the tendency of the rake-head, moving parallel to the sickle-bar, is to shove the cut grain forward into that which is standing, instead of pulling it back, as all other rakes do; thus the sickle becomes clogged and cannot cut clean. Another objection which, however, is peculiar to Wood's rake is, that when the straw is moist it is apt to be caught by the endless chain and wound around the sheaves, causing delay and much inconvenience.

The Seymour or New York Rake.—The principle of motion of rakes belonging to this class is one of reciprocation about two axes, one vertical and stationary, with reference to the machine, the other horizontal and movable; the former enables the rake to sweep in the plane of the platform, through an arc of at least 90 degrees, the latter allows it to be depressed to seize a gavel and to be raised in delivering it. As a consequence of this motion the sheaves are delivered quite clear of the horse-track, and each gavel approaches in form to a right-angled parallelogram whose base is parallel to the horse-track. (See Fig. 2.) The mechanism of

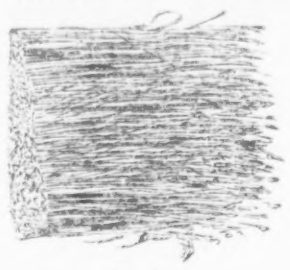

Fig. 2.

rakes of this class may vary very much in detail, but the principle of motion is the same in all of them. The "Triumph" and "Esterly" rakes are very good illustrations of this principle. Good points about rakes of this class are that they have generally few working parts, are durable and perfectly controllable, and, lastly, deliver a "square" bundle even under unfavorable circumstances.

One drawback, which was, until the introduction of the shifting reel in the "Triumph," common to all rakes of this class, was that when the grain was very short the reel could not be set as low and as far back as would be desirable to have it in order to cut to the best advantage, without danger of having the vanes of the reel caught by the rake. In the "Triumph" this difficulty is overcome by a very simple device, causing the reel to shift forward when the rake approaches, and return to its proper position when the rake recedes. Thus the reel and rake are both made to do their work effectually without interfering with each other.

TABLE-RAKE VERSUS REEL-RAKE.

The following paragraphs, in which the superiority of the table-rake over the Dorsey or Johnston reel-rake is shown, are extracted from one of Aultman, Miller & Co.'s circulars. Since they clearly bring out some of the drawbacks of the Dorsey rake we shall give them below, though not without comment:

"First. The overhanging reel used on the table-rake is independent of the rake and cam, without affecting the latter, be made to revolve fast enough to do its work well, while with the reel-rake there is great need of faster motion of the reel arms, but which cannot be secured without injuring the working of the rake."

This is true only of the class of reel-rakes revolving about a horizontal axis, as already described. In the Dorsey rake, to which particular reference is made, it is not so important that the speed should be increased for short grain, as is the case for other types of rakes and reels, because each reel-vane being at the same time a rake and passing very closely over the cutter-bar, clears the sickle by moving the cut grain slightly back, and in cutting very short grain, and also such that is badly lodged or much entangled, the Dorsey rake will do much better work than the table-rake, for reasons already mentioned.

"Second. In the overhanging reel the vanes are always parallel to the cutter-bar, while in the reel-rake the rake heads or vanes are not only not parallel with the cutter-bar, but their motion at the outside shoe is several times faster than at the inside shoe. This defect of the reel-rake necessarily tends to throw the grain diagonally across the platform, and as the grain is not compressed into a bundle before delivering, it is dropped upon the ground in much the same shape as it falls upon the platform. The overhanging reel of the table-rake puts the grain squarely upon the platform, and the rake compresses it into a bundle and delivers it in so much better shape for binding that four men can bind more grain after a table-rake than five can after any reel-rake."

This again is not generally true, since the table-rake only does superior work when the grain stands straight and is of sufficient length. As a rule, the compressing of the gavel does not save much labor, because it spreads again to a considerable extent as soon as the rake lets go, resulting generally in a waste of energy on the part of the draught animals.

"Third. The well-known tendency of the reel-rake to throw a twisted bundle in straight grain is in part due also to the shape of the platform. That part of the bundle lying nearest the body of the machine, at which part the platform is generally too narrow, necessarily touches the ground first, allowing the heads to catch in the stubble and leaving the straw nearly parallel with the tracks of the driving wheels; the balance of the bundle, which leaves the platform an instant later, is thrown nearly square across that already on the ground, making from uniformly standing grain about as ugly a bundle to bind as can well be imagined."

This is a fact, and it is a greater drawback to the reel-rake than all the other objections put together.

"Fourth. In our new table-rake the jointed rake-arm can be started any instant and stopped at any point of the circuit, so that the bundle when gathered may be carried on the rear of the platform around a corner or as far as desired, while the reel-rake (and this is true of them all without an exception), when once it has started to deliver a gavel, cannot be stopped while the machine is in motion, but the bundle must be delivered, no matter in how inconvenient a position."

This is quite true; for although the most of the reel-rakes of the Dorsey type (the others as we have already seen are absolutely uncontrollable) are to a certain degree controllable, they are not entirely so, as is the case with the independent rakes, of which the table-rake is a type, and inconvenience may arise from that want.

C. Attachments which are designed to transport and elevate the grain to a platform or cradle, from which it is conveniently taken and bound by two or more men riding on the machine. These attachments may again be subdivided into three classes, according to the mechanical principles involved.

1. Machines in which the grain is carried to an elevated platform by means of one or more endless aprons or belts. The endless apron was one of the first contrivances employed for taking care of the grain after it was severed from the stubble. It was used as early as 1826 in Bell's machine. In 1838 Ira Wheeler employed it in his machine, in which it carried the grain to a box with a sliding cover, from which it could be dropped in gavels. In 1840 S. Lamb, of New York, employed the apron to transport and elevate the grain to a platform while a man riding on the machine took and bound the same. This was the first machine which properly belongs to the class we are now about to consider.

Although several attempts had been made to employ the endless apron for the above purpose, it was not until Messrs. Marsh brought out a machine, which quickly gained a reputation, that the endless apron was successfully employed.

The "Marsh" harvester is well known in numerous Western localities, and in the estimation of some farmers stands pretty high. Messrs. Marsh employ a single apron, placed horizontally, upon which the cut grain falls, and which carries it along until it meets a series of belts, with projecting pins, which take and elevate it to the binders' platform. The "Marsh" harvester and, generally, all machines of this class, are designed for two workmen to ride upon them and bind the grain as fast as it is cut.

Other manufacturers, among whom are Messrs. McCormick, of Chicago, and the Massilon Harvesting Co., of Massilon, Ohio, employ, instead of a series of belts with projecting points, two canvas aprons, in close proximity to each other, between which the grain is elevated.

The great advantage which harvesters possess over common reapers, is that two men can do as much binding on one of them as four or five can after a reaper, provided the grain stands well enough for the harvester to cut it at all.

The great drawback to harvesters generally, is that they are unable to cut lodged or even badly entangled grain. The reason for this is twofold—First, on account of the room required by the endless apron to revolve around the rollers and the additional thickness the platform receives by boarding from below to guard the apron, it becomes so thick that the cutter-bar cannot be lowered enough to pick up large grain; and, second, the grain being entangled will adhere to the standing grain at the butt end, the heads being free will move along much faster, and thus it will arrive at the binders' platform in anything but good shape, making it impossible for the binders to do the binding as fast as the machine cuts.

For a good crop, a machine cutting a five-foot swath will deliver a sheaf of proper size for every 13 feet of linear advance. If we take the speed of the machine at 260 feet per minute, which, although a little above the average, is not unfrequently attained, and when the work is pressing, even kept up all day, the harvester will cut at the rate of 20 sheaves per minute, which gives only 6 seconds for binding a sheaf. When we consider the motions to be gone through in binding one sheaf, viz, making the band, turning and taking the gavel, turning back, tying and pitching it off the machine, we find 6 seconds a very short time to perform the operations, even when the grain is delivered in the best possible shape; but when the grain is entangled it is impossible for two men to bind it into presentable sheaves.

Several attempts have been made to overcome this difficulty, but without decided success. Messrs. Marsh introduced triangular projections on the sickle, so placed and shaped that they must aid in propelling the butt end of the grain toward the elevation. E. B. Rice, of Madison, Wisconsin, has patented a complex apron, the special object of which is to overcome this difficulty. The horizontal portion consists of several bands, which move with different velocities, the one nearest the cutter-bar moving fastest We do not know whether this device has proved effective or not; but it would appear that, if it is capable of carrying up entangled grain straight, it will be very apt to carry straight grain up butt end first, since that part of the apron moves much faster, and there being in the latter case no retardation; besides, the compound apron will cause a multiplication of parts which greatly complicates the machine

2. Harvesters in which the grain is carried to the binders' platform by means of a series of moving pieces called carriers. In the machine built by the Adams and French Harvester Co., of Cedar Falls, Iowa, the carriers consist of angular pieces of wood, having short pins projecting upward; they are hung upon and derive their motion from two double-elbowed shafts. The alternate carriers being hung on opposite sides of the axis of rotation of the shaft, will move in an opposite direction of the adjacent ones; thus, when 1, 3 and 5 are moving toward the binders' table, above the center of the shaft, 2, 4 and 6 will be moving away from it below; after half a revolution of the shaft, 2, 4 and 6 will be above the center of rotation and moving forward, while 1, 3 and 5 are returning below. The grain, resting upon the elevated carriers only, is continually moved toward and finally deposited upon the binders' platform. This attachment is very effective in its operation, and as far as the carrying power is concerned, is a great improvement over the apron; its motion is a positive one, and allowing no slip, is very apt to carry entangled grain up in better shape than can be done by either the single or complex aprons. Objections to this device are: 1. Requires more room in thickness of platform than the apron, thus limiting the lowering of the cutter to a still greater extent; 2. The vibrating motion of the carriers cannot but thrash out some of the grain, when the latter has become over or dead ripe, which cannot be always avoided. The latter objection may become serious.

3. Harvesters in which the cut grain is elevated to the binders' platform by two or more independent movements, similar in principle to some of the rake attachments previously discussed. Some of these machines employ two rakes, one of which elevates the gavel, the other shoves it in a more or less compact form to the binders' stand. Machines of this kind are generally complicated and clumsy, and we have not been able to learn whether any of them are really in successful operation. A harvester of this class, exhibited at the Centennial Exhibition by George Esterly & Son, of Whitewater, Wisconsin, presented some novel features which are worthy of consideration. The mechanical principles employed in this machine are very simple. The lower platform is a surface of revolution whose section is an arc of rather less than 90 degrees; the lower edge of this cylindrical platform is in the same horizontal plane with the cutter-bar, and the upper edge nearly at right angles with the binders' platform. Eccentric with the reel about an axis identical with that of the cylindrical surface of the platform, there revolves a vane sweeping closely to this surface, carrying with it what grain there has been cut and collected, and deposits it on the upper platform. On this there reciprocates a guide-board which shoves a bundle alternately to one and then to the other side of the platform, where the binders receive and bind it. This machine has several marked advantages over the harvesters already discussed. 1st. The binders receive the gavels right before them ready to put the band around, whereas in the common harvesters, the grain being brought up in a continuous stream at their side, they must turn, take enough for a sheaf, which must be separated from that which remains, and then turn back, before they can go on with the binding proper. These motions, having to be repeated for every sheaf, amount to considerable work during a day, which the binder on the Esterly harvester has no need of performing. 2d. The platform containing no working parts is made as thin as an ordinary reaper platform, thus allowing the cutter-bar to be lowered as much as necessary for cutting quite short and lodged grain. The drawbacks to this machine are as follows: 1st. The mechanism for elevating the grain being on the principle of a reel-rake about a horizontal axis is not at all controllable, delivering a gavel at regular intervals of linear advance irrespective of its size. 2d. One of the binders standing immediately back of the grain wheel necessarily creates side draft 3d. The vane in elevating the gavel pushes the same bodily ahead of itself; thus there would seem to be a "critical" point when the vane reached the upper edge of the curved platform, at which point an irregularity in the advance motion of the machine or a contrary breeze of wind might cause the gavel to fall in the wrong direction, *i. e.*, back on the lower platform instead of on the binders' table. This would be very disagreeable to say the least, and on a windy day might become fatal to the successful operation of the machine.

(To be continued.)

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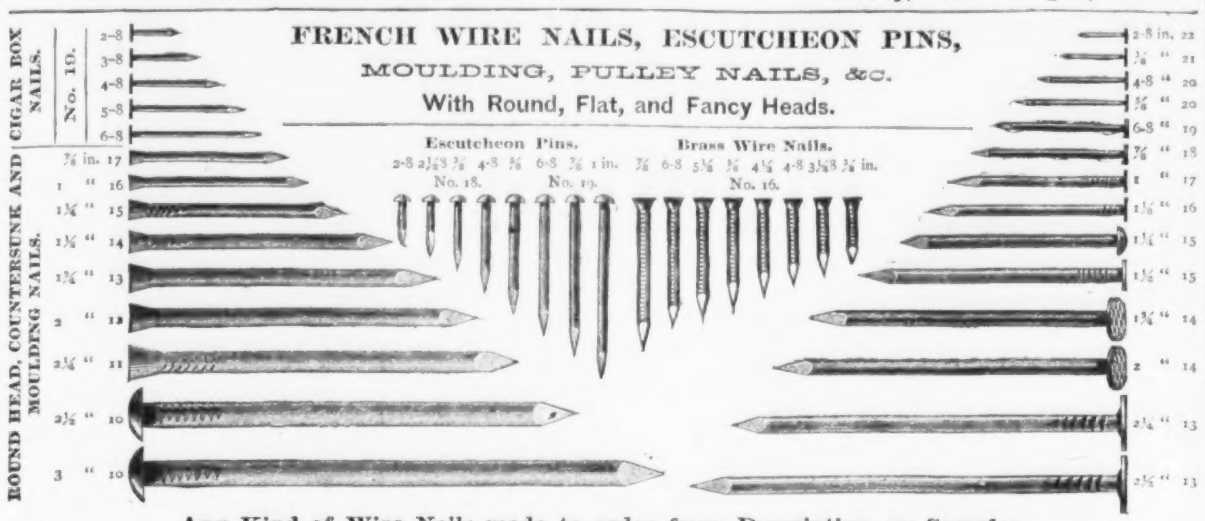

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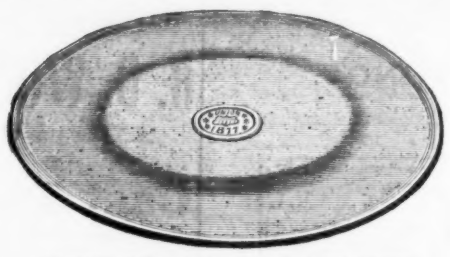

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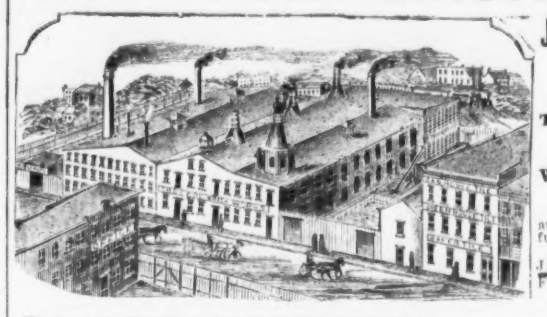

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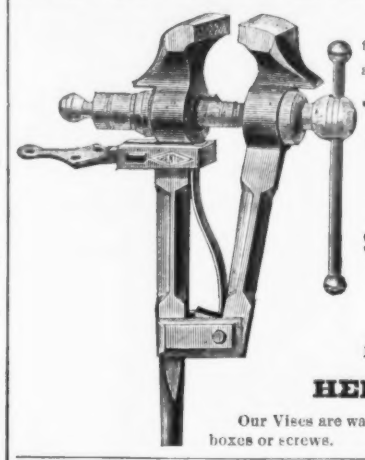

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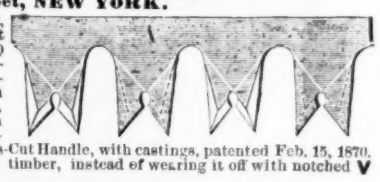

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Signature of the Judge.

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J. DIFENBACH, of Germany, DAVID McHARDY, of Scotland, D. STEINMETZ, of Phila. } JUDGES.
A true copy of the record. FRANCIS A. WALKER, Chief of the Bureau of Awards.
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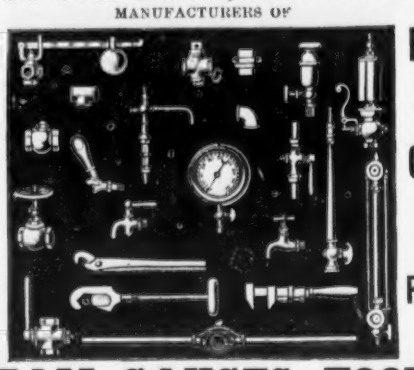

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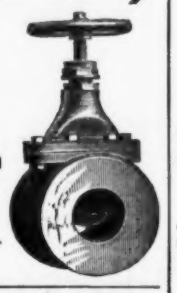

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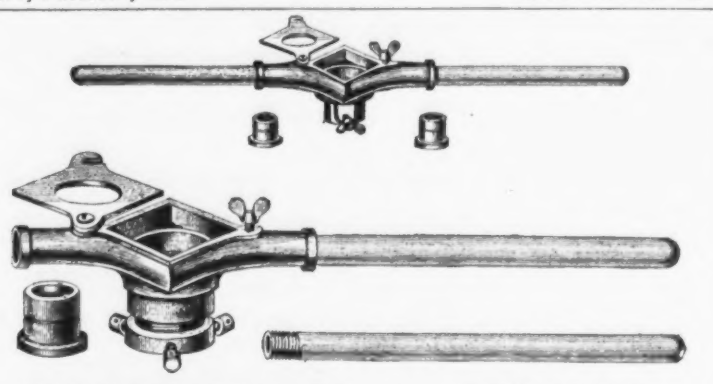

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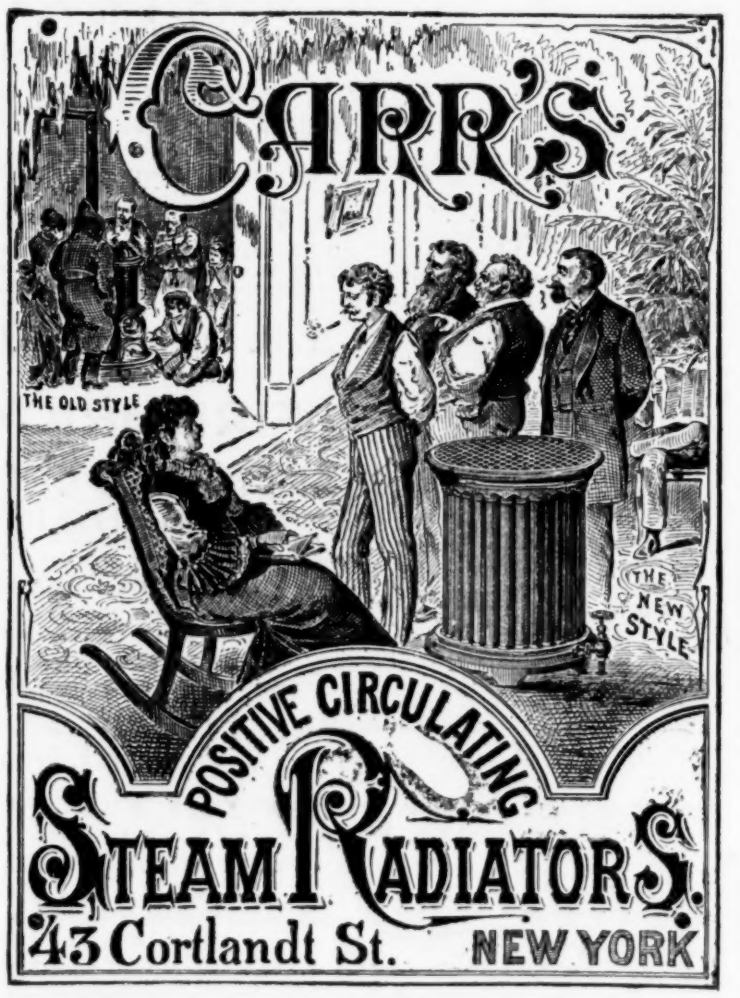

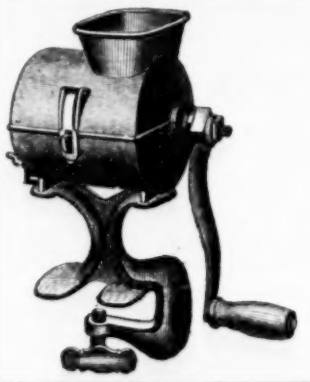

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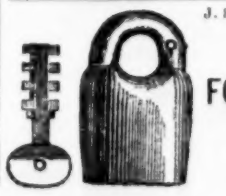

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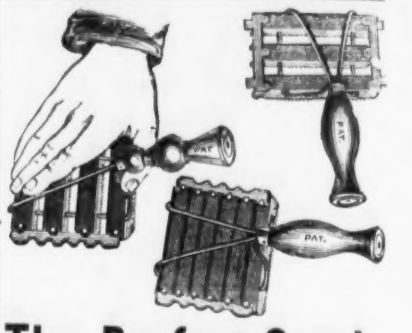

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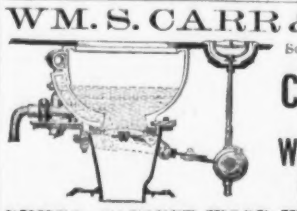

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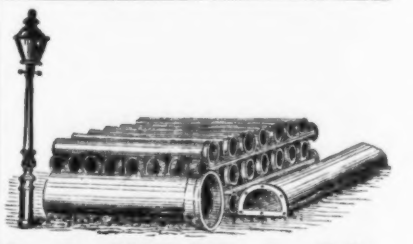

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The Bullard Machine Co., 14 Dey, N. Y. 30
Wetherill Robert & Co. Chester, Pa. 42

Machine Screws. *Makers of.*
Lyon & Fellows Mfg. Co., Williamsburg, N. Y. 12

Machinists' Tools. *Makers of.*
Blaisdell P. & Co., Worcester Mass. 42
Prentiss H. & Co., 14 Dey, N. Y. 12

Machinists.
Leng & Ogden, 212 Pearl, N. Y. 30

Malleable Iron Castings. *Maker of.*
Hammer & Co., Branford, Ct. 42

Measuring Tapes.
Eddy Geo. M. & Co., 353 Classon Ave., Brooklyn, N. Y. 6

Mallets.
N. Y. Handle & Mallet Works, 456 E. Houston. 40

Manganese.
Pyrolusite Manganese Co., 214 Pearl, N. Y. 36

Mangles.
Standard Laundry Mach. Co., Boston & New York. 27

Meat Choppers.
Kinyon Bros., Raritan, N. J. 27

Meat Chopping Machinery.
Murray Iron Works, Burlington, Iowa. 36

Metal Dealers and Brokers.
Crane U. O., 104 John, N. Y. 4
Dickerson, Van Dusen & Co., 29 & 31 Cliff, N. Y. 5
Gregg H. L. & Co., 108 Walnut, Phila. 5
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Purves A. & Son, cor. South and Penn, Phila. 5
Quincy J. W., 98 William, N. Y. 31
Sellew R. & Co., St. Louis Mo. 2

Metal Elbows.
Hogen Elbow Co., Cleveland, O. 38

Metallurgists.
Britton J. Blodgett 309 Walnut Phila. 6

Metals Perforated.
Hayes G., 71 8th ave. 2

Metal Roofing.
Brass Goods Mfg. Co., 280 Pearl N. Y. 2

Mica.
The Chester Mica and Porcelain Co., 87 Liberty, N. Y. 3

Miners' Candles. *Makers of*
James Boyd's Sons, 10 and 12 Franklin, N. Y. 42

Models.
Lennox & Paine, Cleveland, O. 8

Mouse Traps, Catchemalive, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y. 44

Mowing Machine Knife Grinder.
Fisher Henry, Canton, O. 36

Nails.
Schoenberger & Co., Pittsburgh, Pa. 4
Zug & Co., Pittsburgh, Pa. 4

Nail Machinery.
Coyne & Hatry, Pittsburgh, Pa 4

Nail Pullers.
Maltby, Curtiss & Co., 34 Reade, N. Y. 6

Nickel Platers.
Hartman John, 3754 N. Seventh, Philadelphia. 31
Manhattan Nickel Works, 180 and 182 Center, N. Y. 31
Owen S. S. & Co., 121 E. 13, N. Y. 31

Nickel Platers' Supplies
Colt A. T., 47 Beekman, N. Y. 31
Zucker & Levett, 639 & 641 W. 51st, N. Y. 31

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, Frankford, Phila. 44

Note Broker.
Gallanget P. W. 3 and 5 Wall, N. Y. 4

Nuts, Bolts, etc., *Makers of.*
Clark Bros. & Co., Millvale, Conn. 12
Fuller Bros. & Co., 139 Greenwich, N. Y. 4
Haskell W. H. & Co., Pawtucket, R. I. 13
Lewis, Oliver & Phillips, Pittsburgh, Pa. 13
Russell, Birdsall & Ward, Port Chester, N. Y. 44
Shelton Co., Birmingham, Conn. 44
Sternbergh J. H., Reading, Pa. 44
Union Nut Co., 78 Beekman N. Y. 38

Oil Cook Stoves.
C. Reissner & Co., 242 Pearl, N. Y. 13

Oil Lubricating, *Makers of*
Lester Oil Co., 81 Maiden Lane, N. Y. 29

Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia. 5

Ore Crushers.
Blake Crusher Co., New Haven Ct. 42

Packing (Steam).
Symonds & Co., Philadelphia. 37

Paint (Iron).
Pittsburgh Iron Paint Co., Pittsburgh, Pa. 28

Patents and Oils. *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y.

Pans, (Dripping and Bread.)
Lewis, Daizell & Co., Pittsburgh, Pa. 3

Patent Solicitors.
Howson & Son, Phila. and Washington, D. C. 25
Lemmann F. A., Washington, D. C. 25
Spencer A. H. 48 State Boston, Mass. 27
Stetson Thos. D., 23 Murray, N. Y. 25

Peas, (Steel).
Perry & Co., Limited, 112 & 114 William, N. Y. 28

Picks, *Makers of*
Pierson & Co., 24 Broadway, N. Y. 4

Pipes, Fittings, etc., *Makers of.*
Eaton, Cole & Burnham Co., 58 John, N. Y. 30
McNab & Harlin Mfg. Co., 56 John, N. Y. 30
Pancoast & Maule, 257 Pear, Phila. 30

Pipe, Water and Gas, *Makers of.*
McNeal & Archer, Burlington, N. J. 6
Wood R. D. & Co., 400 Chesnut, Phila. 30

Plane Irons. *Manufacturer of*
Buck Bros., Millbury, Mass. 13
D. R. Barton Tool Co., Rochester, N. Y. 13

Planes. *Manufacturers of*
D. R. Barton Tool Co., Rochester, N. Y. 13
Stanley Rule & Level Co., 55 Chambers, N. Y. 3

Plated Ware.
Derby Silver Co., Derby, Ct. 44
Hall, Elton & Co., 75 Chambers, N. Y. 11

Pliers.
Hagstoz & Thorpe, Philadelphia. 11

Plows.
Meikle Thomas & Co., Louisville, Ky. 12

Plows, Chilled Iron. *Makers of.*
South Bend Iron Works, South Bend, Ind. 41

Plumbago.
Congreve & Sanders, 104 John, N. Y. 3

Plumbers' Materials, *Manufacturers of*
Everhart Jas. M., Scranton, Pa. 44
Carr Wm. S. & Co. 100 Centre, N. Y. 30

Presses, Power. *Makers of.*
Bliss & Williams, 167 Plymouth, Brooklyn. 43
Merriman A. H., West Meriden, Ct. 40
The Stiles & Parker Press Co., Middletown, Ct. 43

Pressure Blowers. *Makers of.*
Keystone Portable Forge Co., Philadelphia. 43

Pulleys, Friction.
Penfield Block Works, Lockport, N. Y. 13
Thompson Joseph, 36 Burling Slip. 8

Pumping Engines, (Hot Air) *Makers of*
Rider, Wooster & Co., Walden, Orange Co., N. Y. 41

Pumps, *Makers of.*
Douglas W. & B., Middletown Conn. 7
Kilvert & Tappen Boston, Mass. 43
Nason Mfg. Co., 71 Fulton, N. Y. 7
Rider, Wooster & Co., Walden, Orange Co., N. Y. 41
Rumsey & Co., Seneca Falls, N. Y. 7
Union Mfg. Co., 98 Chambers, N. Y. 7

Railroad Frogs.
Penna. Steel Co., Steel Works P. O., Pa. 6

Railroad Supplies.
Jackson & Tyler Baltimore, Md. 37
Nicolls Wm. J., Baltimore, Md. 4
Rogers H. A., 19 John, N. Y. 9

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa. 6
Cambria Iron Co., Johnstown, Pa. 5
Cleveland Rolling Mill Co., Cleveland, O. 6
The Edgar Thomson Steel Co., 57 Broadway, N. Y. 37
Wood & Leman, 34 Wall, N. Y. 4

Razor Strops, *Makers of.*
B. F. Badger & Son Charlestown, Mass. 8

Rivets.
Gilmor Wm. of Wm., Baltimore, Md. 12
Townsend W. P. & Co., Pittsburgh, Pa.

Road Rollers.
Pioneer Iron Works, 149 William, Brooklyn, N. Y. 41

Road Scrapers, &c.
Semple & Birge Mfg. Co., St. Louis, Mo. 29

Rolling Mill Machinery, etc., *Manufacturers of.*
Moore James, Cor 16th and Buttonwood, Phila. 43

Rotary Shears.
Newbold R. S. & Son, Norristown, Pa. 42

Rules, *Manufacturers of.*
Stanley Rule and Level Co., 35 Chambers St. 3
Stephens & Co., Riverton, Conn. 13

Saddlers' Tools.
Osborne C. S. & Co., Newark, N. J. 25

Sand and Emery Paper. *Makers of*
Baeder, Adamson & Co., 750 Market, Phila. 40

Sad Irons.
Enterprise Mfg. Co., Philadelphia. 38

Sash Fasteners.
Babcock C. P., Portland, Me. 12

Saws, *Makers of.*
American Saw Co., Trenton, N. J. 29
Boynton E. M., 80 Beekman, N. Y. 29
Disston Henry & Sons, Phila. 33
Peace & Hogan, Williamsburg, N. Y. 29
Wheeler, Madden & Clemson Mfg. Co., Middletown, N. Y. 29

Saw Frames, Wood, *Makers of.*
Peace Harvey W., Williamsburg, N. Y. 29

Scales, *Manufacturers of.*
Brandon Mfg. Co., Brandon, Vt. 7
Chattillon John & Sons, 91 Cliff, N. Y. 9
Rienle Bros., 9th above Master, Phila. 30
Southwark Hardware Co., Philadelphia 31

Screws, *Makers of.*
American Screw Co., Providence, R. I. 18
Miles F. S., 206 Quarry, Phila. 12
Russell & Erwin Mfg. Co., New York. 10

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y. 6

Screw Drivers, (*Improved*) *Makers of.*
Disston Henry & Sons, Phila. 33

Scroll Saws.
Trump Bros., Wilmington, Del. 3

Scythe Stones.
Dishman F. E., New Albany, Ind. 37
Pike A. F., East Haverhill, N. H. 11

Shafting.
Wood Thomas, Philadelphia. 41

Shovels, &c.
Hubbard, Bakewell & Co., Pittsburgh, Pa. 27
Hussey, Binns & Co., Pittsburgh, Pa. 41
Kimball Shovel Co., Baltimore, Md. 25
Remington E. & Sons, 57 Reade, N. Y. 41

Shot, etc.
Sparks Thos. W., 121 Walnut, Philadelphia. 7

Shears, Scissors &c.
Marx Bros., 439 B'way, N. Y. 11

Sheers (Sheep).
Hildick A. H. & Co., 12 Warren, N. Y. 11

Shears (Wrought Iron).
Brown & Curtiss, Cleveland, O. 8

Sieves (Metallic).
Dayton Geo. E., Chicago. 38

Skate Sharpeners.
Kistner & Hummel, Selin's Grove, Pa. 39

Sleighs.
Crosby, Gilzinger & Co., Rondout, N. Y. 29

Smelting Works.
Mackenzie & Sayre Mfg. Co., 141 Broadway, N. Y. 44
Reeves Paul S., 760 South Broad St. Phila. 42

Snaps.
Hold Back & Snap Co., Troy, N. Y. 32

Spelter.
Manning & Squier, 113 Liberty N. Y. 2

Springs.
Rowland Wm. & Harvey, Frankford, Phila. 44

Stamped and Japanned Tin Ware.
Shepard Sidney & Co., Buffalo, N. Y. 35
The Chicago Stamping Co., Chicago, Ill. 3

Stave Jointer.
Crossley H. A., Cleveland, O. 27

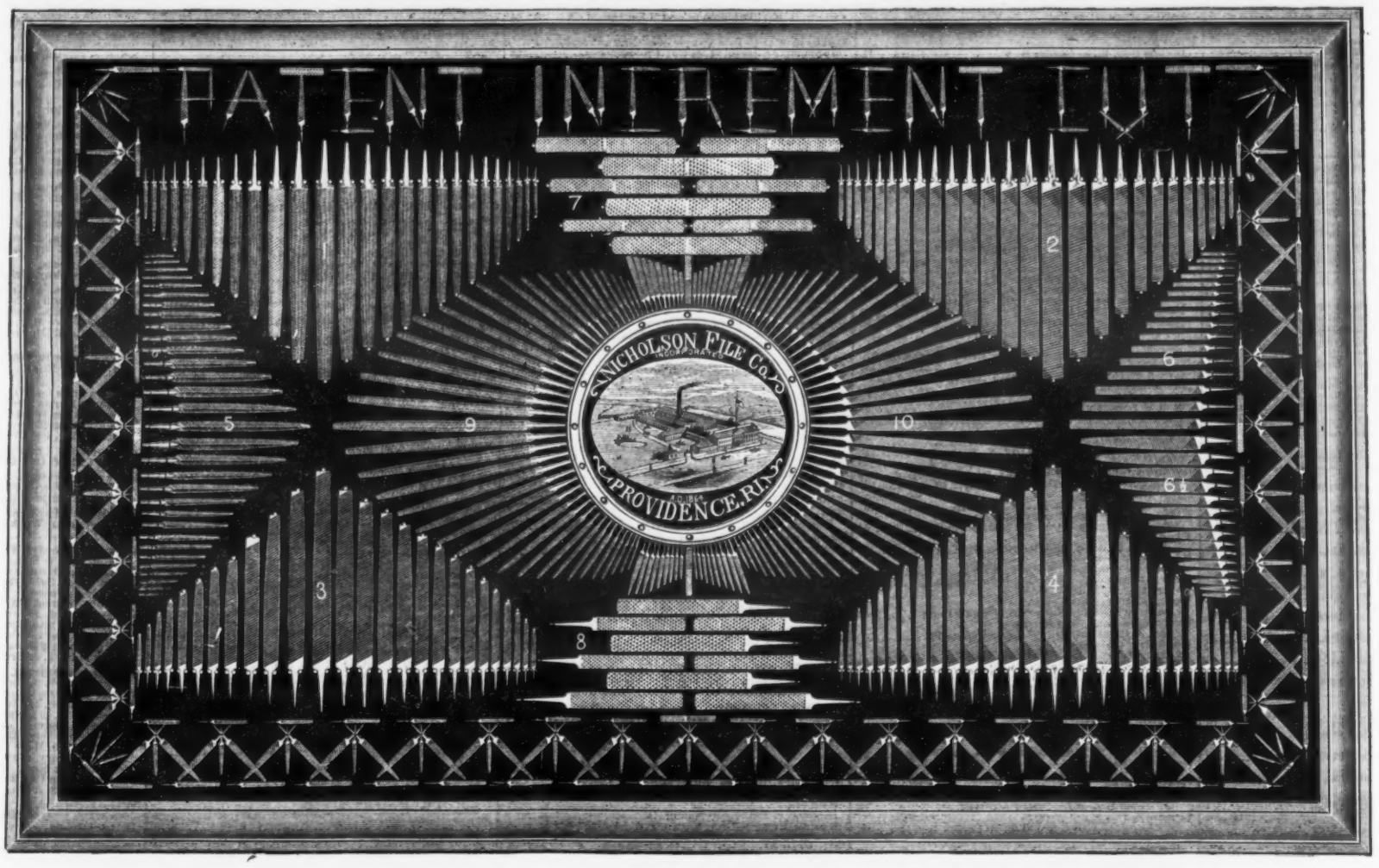
Steam Hammers, etc., *Makers of.*
Bradley Mfg. Co., Syracuse, N. Y. 42
Dudgeon Richard, 24 Columbia, N. Y. 30

Steam Pumps, etc., *Manufacturers of*
Cameron A. S., East 23d, N. Y. 42
Carr A., 43 Cortland, N. Y. 30
Clayton Jas., 11 Water, Brooklyn, N. Y. 3
Crane Bros. Mfg. Co. Chicago, Ill. 34
Knowles Steam Pump Works, Warren, Mass. 38
McGowan John H. & Co., Cincinnati, O. 40
Valley Machine Co., East Hampton, Mass. 40

Steam Traps
Albany Steam Trap Co., Albany, N. Y. 42
Jones A. L., Philadelphia. 36

Steel Castings. *Manufacturers of*
Chester Castings Co., Evelt

NICHOLSON FILE COMPANY, Providence, R. I.



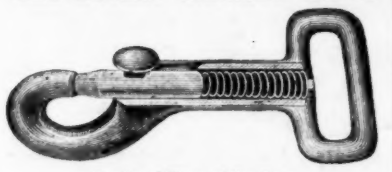
KEY.

1.—Half Round.	3.—Mill.	5.—Triangular.	6½.—Knife.	8.—Tanged Rasps.	10.—Square.
2.—Hand.	4.—Flat.	6.—Pillar.	7.—Plain Rasps.	9.—Round.	11.—Borders.

In addition to above we manufacture **FILES AND RASPS** of every description and kind known to the trade. These goods are not excelled, and by a large proportion of both **Consumers** and Dealers are admitted as superior to any either of **Foreign or Domestic Manufacture.** We are constantly improving and adding to our machinery, and by carrying a stock of from 30,000 to 50,000 dozen Files on our shelves at all times, we are enabled to fill orders with the utmost dispatch, thereby saving both loss of **Trade** and **Interest** to our customers.

For several months past we have been engaged upon a **Catalogue** and **Treatise,** illustrative of the **File and its Uses,** which we hope soon to have ready for distribution. In this work we expect to introduce several new and important appliances connected with the uses of the File.

THE COVERT HARNESS SNAP.



Sectional View of the Snap.

THE COVERT SNAP AND THIMBLE

For Horse and Cattle Ties.

If you want the best at reasonable prices, send for illustrated circular and price list of the celebrated Covert Harness Snap, Horse and Cattle Ties, Breast Chains, Halter Chains, Post Chains, Rein Chains, &c.

These goods are sold by all leading jobbers in General and Saddlery Hardware at manufacturers prices. Sample Snap sent free of charge if desired.

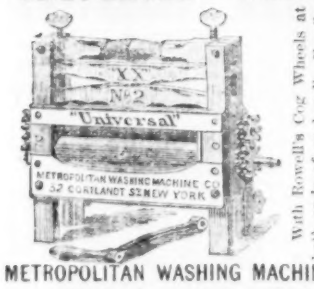
Address **COVERT MFG. CO.,**
Sole Manufacturers, **Troy, N. Y.**

CLOTHES WRINGER!

Self-Adjusting Steel Elliptic Springs.

T. J. ALEXANDER, Manager.
BOSTON, MASS.

"UNIVERSAL" WRINGER



With Bowell's Cog Wheels at both ends of each roll. Family Size.—No. 2½, $3; No. 2, $6; Large, No. 1½, $4.

METROPOLITAN WASHING MACHINE CO.,
32 Cortlandt St., New York.

The Silver & Deming FAMILY SAUSAGE STUFFER, Lard, Fruit & Jelly Press.

Powerful, Durable and Convenient.

The Best Article of the kind in the Market.

No. A, capacity	2	quarts,	Japanned	$2.50
" B, "	4	"	"	4.00
" AA, "	2	"	with inside of Cylinder Enameled	4.00
" BB, "	4	"	with inside of Cylinder Enameled	5.50

Liberal discount to the trade.

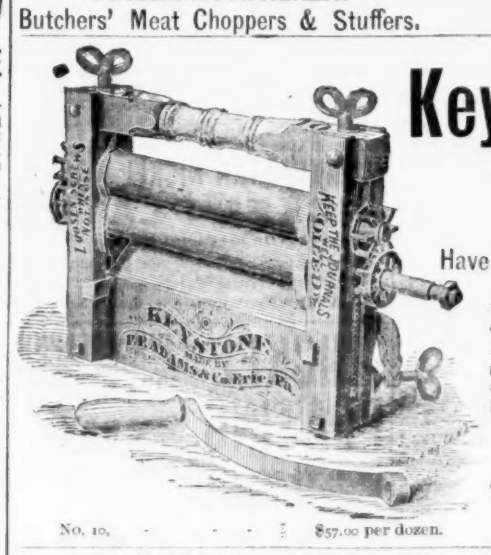
MANUFACTURED BY

SILVER & DEMING MFG. CO.,
SALEM, OHIO.

Also Manufacturers of a full line of
Butchers' Meat Choppers & Stuffers.

Fig. 2.

(Tipped back for filling.)



No. 10, - - - - $57.00 per dozen.

THE

Keystone Wringers

Have all the Latest Improvements,

And are made in a variety of styles—Wood Frame, Iron Frame, with Common Gears, Purchase Gears or without Gearing. All have **Long Spiral Steel Springs**, giving them **Double the Capacity of any other Wringer** and **Greater Durability.**

F. F. ADAMS & CO.,
ERIE, PA.,
CHAS. D. & W. S. GRAHAM,
No. 88 Wall Street, New York,
AGENTS.

BRYANT'S "NEW PATENT IMPROVED"

(ORIGINAL REESE PATENT ADJUSTABLE)

Self-Locking Stencil Letters and Figures.

Observe this patented

TRADE MARK.

(Registered 1876. Reissued 1877.)

Assorted sizes for Straight, Circular and Hal Circle Printing. These letters **Change** to form any **Name, Word** or **Sentence, at pleasure.** Millions retailed yearly for Bag Plates, etc., marking Robes, Show-Cards, and a thousand daily uses.

Superior to All Other Stencils.

Also Inks, Brushes and all kinds of Stencils and Stock in large variety, at wholesale. These patent letters have been sustained by the U. S. Courts, in suit, O. G. Bryant vs. S. W. Reese & Co., before Judge Drummond, in Chicago, May 15, 1877. All genuine letters are stamped "Pat. March 3, '74," refuse all others and save suit and costs. These are *the standard goods*, having been four years on sale by me and dealers generally. All Hardware dealers should keep these goods.

O. G. BRYANT, 102 Washington St., Chicago, Ill.

Sole owner of the three original patents in the United States and Canada, and exclusive manufacturer Sold by Hardware Jobbers everywhere. Circulars, samples and price lists with discounts on application

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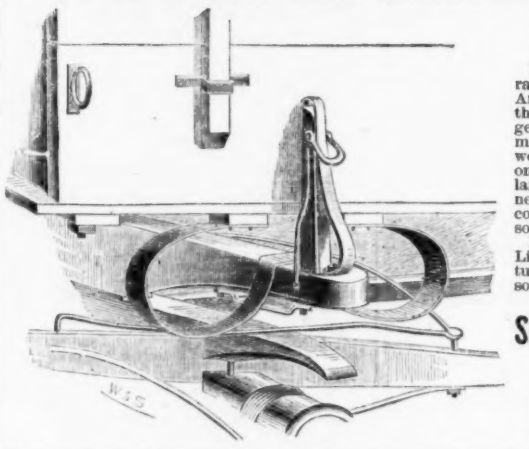
SOMETHING NEW.

BOLSTER SPRINGS

For Farm and Lumber Wagons.



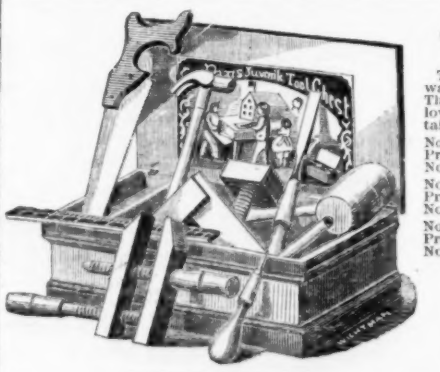
Pulliam's Patent.

Made of the best steel, and warranted. Will fit wagons of any size. Are attached by four bolts through the bottom of the bed. Lift off the gear with the bed. Designed to remain on the wagon for all kinds of work. Operates equally well whether on a loaded or empty wagon. Saves largely in wear and tear. Removes necessity of spring seat. Affords comfortable riding for from one person to a wagon load.

Price, per set of four springs, $6.50. Liberal margin to Wagon Manufacturers and Dealers. Correspondence solicited, and circulars furnished.

Semple & Birge Mfg. Co.
ST. LOUIS.

Parkhurst & Wilkinson,
CHICAGO.



ESTABLISHED 1837.

TOOL CHESTS.

These chests are made of chestnut, with real black walnut trimmings, and Tools of superior quality. They range in price from $7.00 to $8c. each, as follows, according to size and number of Tools contained.

No.	12	13	14	15
Price, each..	$7.00	$5.00	$3.75	$3.00
No. of Tools...	36	28	24	20
No.	16	17	18	19
Price, each..	$2.33	$1.92	$1.50	$1.25
No. of Tools...	21	18	16	12
No.	20	21	22	23
Price, each..	$1.00	75c.	50c.	38c.
No. of Tools...	10	8	8	7

These Chests are made of heavy American Black walnut, with tools of extra superior quality. They range in price from $24.00 to $5.00, according to size and number of tools contained, as follows:

No.	6	7	8	9	10	11
Price, each..	$24.00	$16.50	$12.50	$9.00	$7.00	$5.00
No. of Tools...	60	55	45	33	25	20

Send in your orders early. A liberal discount to the trade. For price lists and discounts address

GEORGE PARR,
Buffalo, N. Y.

LEECHBURG IRON WORKS.

KIRKPATRICK, BEALE & CO.
Manufacturers of all grades of

FINE SHEET IRONS,

(Refined, Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel.

TIN AND TERNE PLATES, made with Natural Gas as fuel.

OFFICE: No. 116 Water St., Pittsburgh Pa. WORKS Leechburg, Pa.

HENRY DISSTON & SONS,

Keystone Saw, Tool, Steel and File Works,

FRONT AND LAUREL STREETS, PHILADELPHIA.

Branch Works, Tacony, Philadelphia. Branch House, Randolph & Market Streets, Chicago, Ill.

Our Celebrated CROSS-CUT AND WOOD SAWS.

All of our Wood Saw Blades, whether Framed or Otherwise, are SET AND SHARPENED READY FOR USE.

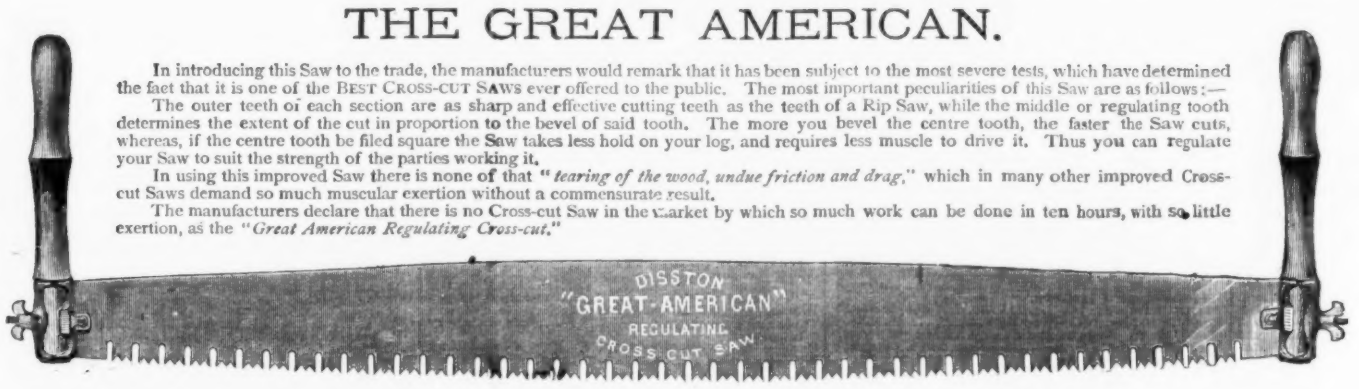
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—

The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.

In using this improved Saw there is none of that "*tearing of the wood, undue friction and drag*," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.

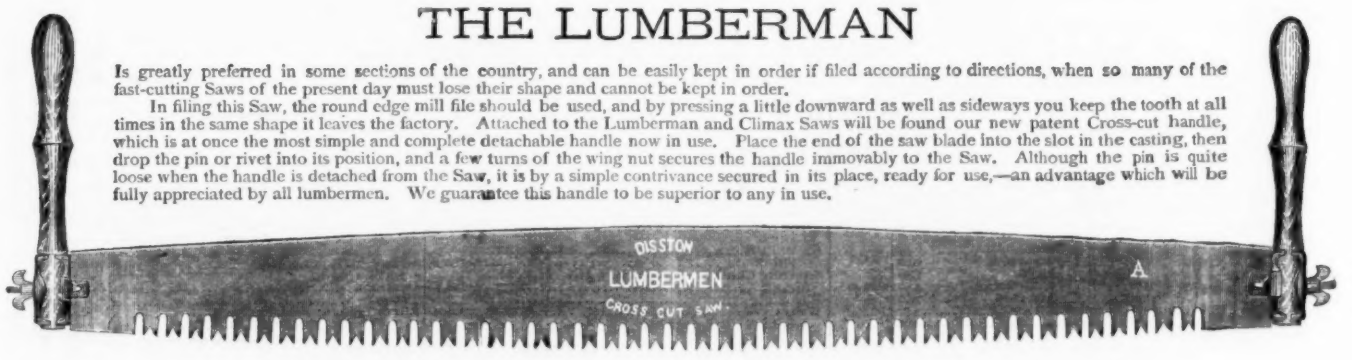
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "*Great American Regulating Cross-cut.*"



THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.

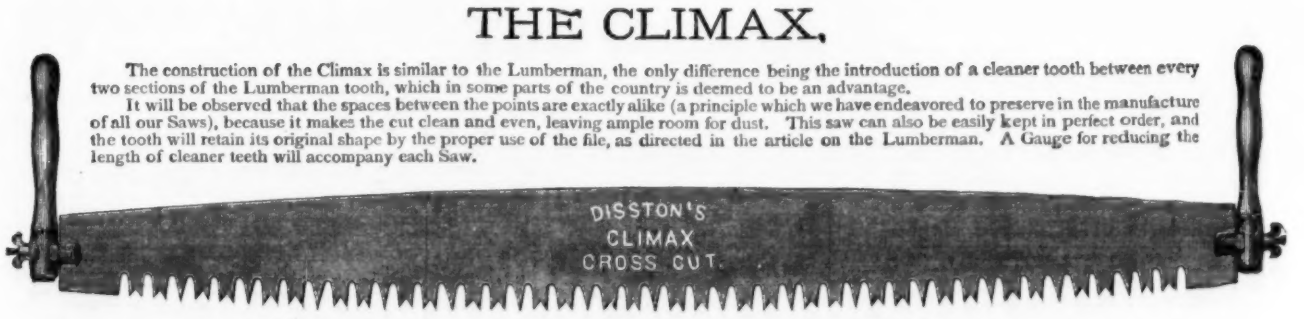
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.

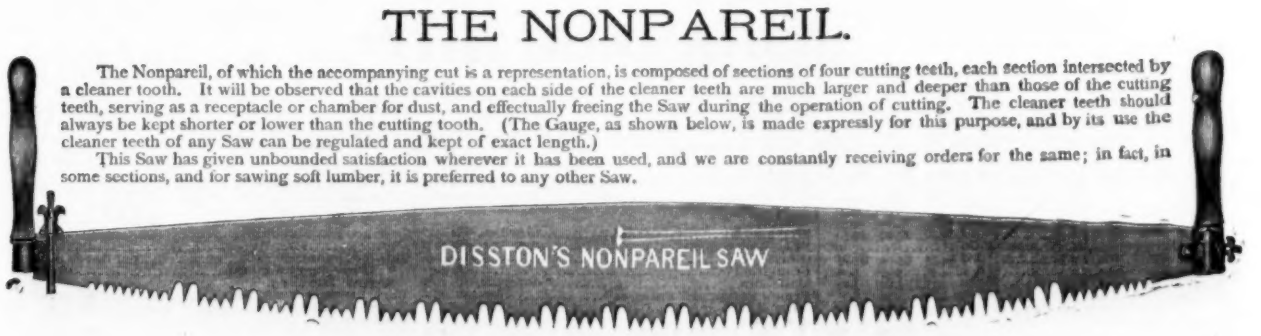
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.

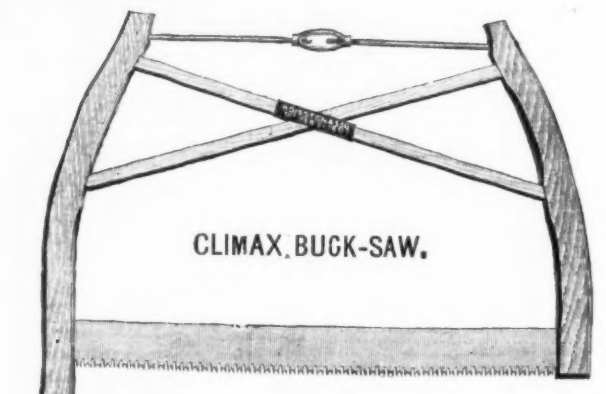


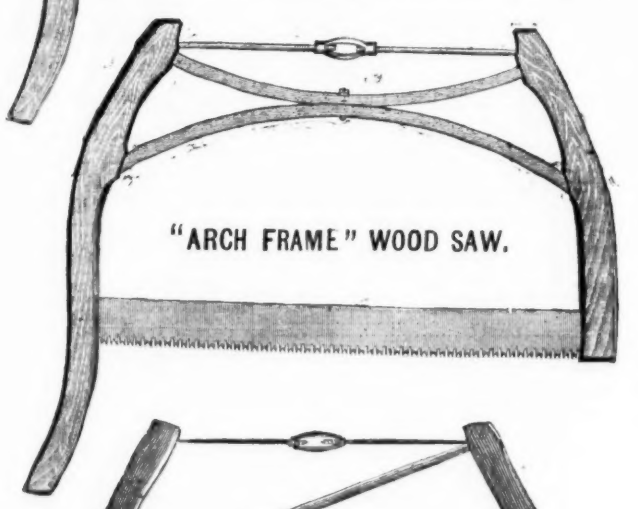
THE NONPAREIL.

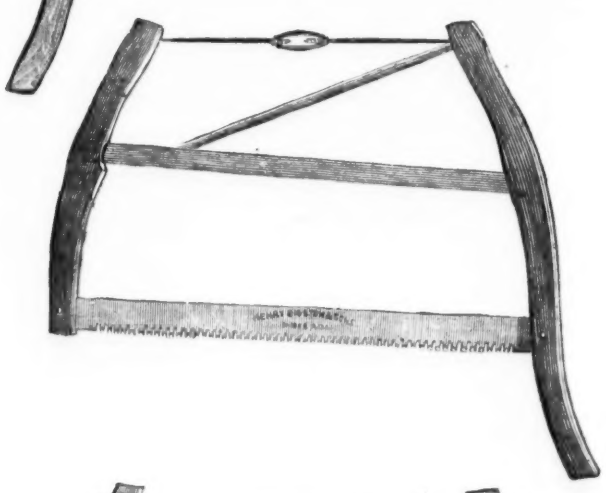
The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)

This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.









New York Wholesale Prices, September 26, 1877.

HARDWARE.

Anvils.
American ₩ lb 15c—dis 20 %
Wright's ₩ lb gold 10½c; over 250 lbs 11c, gold
Armitage's Mouse Hole gold 10 @ 10½c
Wilkinson's ₩ lb gold 11c
Eagle Anvils (American) ₩ lb 9c dis 20 %

Apple Parers.
Bay State Parer, Corer and Slicer ₩ doz $12.00 net
Improved Turn Table ₩ doz 7.50 net
Faultless Turn Table ₩ doz 7.50 net
New Lightning ₩ doz 7.50 net
"Old Reliable" ₩ doz 5.00 net
Climax Corer and Slicer ₩ doz 6.00 net
Lightning Peach Parer ₩ doz 12.00 net

Augers and Bits.
Conn. Valley Mfg. Co.
Douglass Mfg. Co.
Ives
Beecher (French, Swift & Co.) — 1st quality..dis 50 %.. 2d quality..dis 50&5 %
Griswold.
Nobles Mfg. Co.
Kasson's Patent
Cook's, Douglass Mfg. Co. dis 50&5 %
Cook's, Ives' dis 50 %
Snell Mfg. Co. dis 30&10 %
Jennings' Bits dis 10 %
Ives' "Jennings" Bits dis 10&10 %
Lewis' Single Twist Bits dis 33⅓ %
Andrews Bits dis 50 %
Griswold's Patent Bits dis 30 %
Expansive Bits, Clark's, small, $18; large, $26..dis 20 %
" " Ives' $20 @ $30—dis 33⅓ %
" " Blake's $20—dis 40 %
" " Parmelee's ..small, $20; large, $36 dis 25 %
Hollow Augers, Ives' — " " French, Swift & Co. ₩ doz dis 40 %; " " Bonney's Adjust., ₩ doz $48—dis 25&10 %; " " Stearns' Adjust., ₩ doz $48—dis 25&10 %; " " Ives' Expansive....each $4.50—dis 40 %; " " Univ'sal Expansive, each $4.50—dis 20 %
Gimlet Bits—Screw, $7.50; no screw, $9 dis 40 %
" Diamond ₩ doz $1.00 dis 20 %
Double Cut Gimlet Bits, Shepardson's dis 40 %; " " Ct. Valley Mfg. Co.—dis 30&10 %; " " Hartwell's dis 50&10 %; " " Douglass' dis 40 %; " " Ives' dis 40 %
Morse's Bit Stock Drill, List of Jan. 1, '76 dis 25 %
L'Hommedieu's Ship Augers dis 15 %
Watrous Ship Augers dis 15 %

Awls, Brad Sets, &c.
Awls, Sewing, Common ₩ gross $1.35—dis 25 %
" Sewing, Best ₩ gross 1.60—dis 10 %
" Shouldered Peg ₩ gross 2.25—dis 15 %
" Patent Peg ₩ gross .60—dis 15 %
" Shouldered Brad ₩ gross $2.70—dis 25&10 %
Brad Sets, Aiken's ₩ doz $12.00—dis 40 %
" No. 42, $10.50; No. 43, $12.50 dis 60 %
" Clark's dis 50 %
" Stanley's Excelsior..No. 1, $11.00—dis 25&10 %

Axes.
Ten Eyck Axe Mfg. Co.—
Per doz $11.50, 12.00, 12.50 dis 15&5 %

Axles.
Common (Guy C. Hotchkiss, Field & Co.) ₩ lb 4½c
Solid Collar, Case Hardened, Chilled Box ₩ lb 8c

Axle Grease.—Frazer's ₩ lb 6c

Balances.
Light or "Common" dis 25&10 %
All other Spring Balances dis 25 %

Bands.—Plated new list dis 50&5 %
Iron Rim new list dis 25&5 %
Brass (Plated list) new list dis 50, 10&5 %
Oroide new list dis 50&5 %

Bed Keys.
Gray's Ratchet ₩ doz $4.00, dis 15 %

Bells.
Hand, Light Brass dis. 75 %
" Extra Heavy dis 40&10 %
" White Metal dis 50&10 %
" Silver Chime dis 20&10 %
" Swiss dis 25 %
" Globe (Cone's Patent) dis 20&10 %
Gong, Abbe's dis 20&10 %
" Yankee dis 35&10 %
" Barton's dis 40&2 %
Crank, Taylor's dis 25&10 %
" Brook's dis 50 %
" Cone's dis 10 %
" Connel's dis 50&10 %
Lever, Sargent's..dis 60&10&10 %
" Taylor's Bronze or Plated Lever net
" Japanned Lever dis 25&10 %
" Hart, Bliven & Mead Mfg. Co. dis 50&10 %
Pull, " " " " dis 50&10 %
" Brook's dis 50 %
" Western dis 25&10 %
Call dis 20 %
Cow, Common Wrought dis 20&10 %
" Western dis 20&10 %
" Sargent's dis 60&10 %
" Kentucky "Star" dis 20&10 %
" " Sargent's dis 60&10 %
" Dodge's Genuine Kentucky, new list—
Nos. 0 1 1½ 2 3 4 5 6 Hog.
$12.00 10.00 9.00 8.00 6.00 5.00 3.50 2.50 5.00, dis 50 %
" Yaw's Genuine dis 50 %
" Texas dis 40 %

Bellows.
Blacksmiths', Common dis 20 @ 25 %
" Extra and Pittsburgh Pattern..dis 20 %
Moulders' dis 25 %
Hand Bellows dis 20 %

Blind Adjusters.—Domestic ₩ doz $3.00, dis 20 %

Blind Fasteners.
Mackrell's dis 30 %
Van Sand's No. 2000, $14.00, dis 25 %
" old pattern ₩ gross, $10.50, dis 5 %
Washburn's Patent ₩ gross $14.00, dis 25 %
Merriman's new list net
Security Blind Fast ₩ gross $14.00, dis 10 @ —%

Blind Staples.
Boardman's Patent, ½ in. and larger ₩ lb 41c..dis 10&5 %
" ⅝ in. ₩ lb 46c..dis 10&5 %

Blocks.
Differential Pulley Blocks dis 20 %
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list dis 30&10 %
Stanley Rule and Level Co. dis 25&10 %

Blowers.
Keystone Portable Forge Co. dis 20 %

Bolts.
Cast Iron Barrel, Shutter, &c. dis 60&10&10 %
Cast Iron Chain (Sargent's list) dis 60&10&10 %
Bush's Lever Bolts dis 40, 10&10 %
Wrought Iron Barrel dis 50, 10&10 %
" " Square dis 50, 10&10 %
" " Shutter (Stanley's list) dis 50 %
" " (Sargent's new list)..dis 50, 10&10 %
" " Flush, Stanley's dis 15&10 %
" " " Sargent's dis 50&10&10 %
Carriage and Tire, Common dis 75&3 % cash
" " Norway Iron dis 70 %
" " R. B. & W. (old list) dis 65 %
" " Philadelphia dis 60&10 %
" " Colema dis 60&10 @ 60&20 %
" " Shelton's (old list) dis 65&5 %
Star (Phila.) dis 60&10&60&20 %
Union Nut Company, old list dis 60&5 %
Stove—American Screw Co.'s dis 45 @ 50 %
" R. B. & W. dis 50 %
" Shelton's Shaved Head dis 45 @ 50 %
" Union Nut Co. dis 45 %
Plow, R. B. & W. dis 40 %
Machine dis 70 %
Bolt Ends dis 60 %

Borax. 12 @ 12½c ₩ lb

Boring Machines.

	Upright.	Angular.
Hovey's, no Augers	$3.00	$4.00 net
" with Augers	5.00	6.00 net
Parr's, no Augers	5.00	7.50 dis 30 %
" with Augers	7.50	10.00 dis 30 %
Kellogg's, no Augers	5.25	6.75 dis 15 %
Sweets' "	3.25	4.00 net
" with Augers	5.00	6.00 net
Snell's, no Augers	4.75	6.25 dis 25 %
Phillips' with Augers	....	10.00 dis 25 %
Douglass', no Augers	5.50	7.00 dis 40&10 %
" with Augers	11.00	9.00 dis 40&10 %

Bow Pins.
Union Nut Co. dis 60&5 %
Hotchkiss' low list dis 10 %
Humason, Beckley & Co.'s dis 60 %
Sargent & Co.'s..$19.70 and $21.40, dis 60&10 %

Braces.—Barber's Patent dis 40&5 %
O. S. Backus dis 50&10 %
Wilson Mfg. Co. dis 10 %
Spofford's Patent dis 50 %
Nobie's Patent dis 40&5 %
Ives' "Centennial" dis 40&10 %
Common Ball (American) dis 25&10 %

Brackets.—Shelf dis 60&10 @ —&10 %

Bright Wire Goods dis 65&10&10 %

Bull Rings.—Union Nut Co. dis 50&20 %
Sargent's dis 60&5&10 %
Hotchkiss' low list dis 10 %
Humason, Beckley & Co.'s dis 60 %
Union Nut Co. dis 60&5 %

Butts.
Wrought Brass dis 70 %
Cast Brass dis 20 %

COMMON CAST, NOT DRILLED.
Fast Joint, Narrow dis 50 %; " Broad dis 50 %
Loose Joint, Narrow and Broad dis 50 %
Parliament Butts and Mayer's Hinges dis 5 %
Loose Pin dis —
Loose Pin Japanned dis —
Loose Pin Jap'd, Plated Tips dis —

DRILLED AND WIRED.
Fast Joint, Narrow dis 45 %; " Broad dis 55 %; " Broad, Japanned dis 50 %
Loose Joint dis 62½ %; " Japanned dis 62½ %
Parliament and Mayer's Hinges dis 50 %
Loose Pin, no Acorn dis 65 %; " Acorns dis 62½ %; " Japanned dis 65 %; " Plated Tips dis 62½ %

10 per cent. extra discount.

Union Mfg. Co.'s Fancy Butts—
Figured Enameled Loose Joint dis 60&10 %
Boston Finish, Plain dis 80&10 %
" " with Iron Acorns dis 75&10 %
" " with Silvered Acorns dis 65&10 %

WROUGHT IRON.
Fast Joint, Narrow dis 40&10 %
" Lt. Narrow dis 30&10 %
" Broad dis 40&10 %
Loose Joint, Broad dis 40&10 %
Table Butts, Back Flaps, &c. dis 35&10 %
Inside Blind, Regular dis 35&10 %
" " Light dis 40&10 %
Loose Pin, Wrt. dis 40&10 %
Am. Spiral Spring Butt Co., Japanned dis 25 %
" " Fancy dis 10 %
Sabin Mfg. Co., Double Acting dis 35 %
Union Spring Hinge Co. dis 25 %
" Mfg. Co. Spring Hinges dis 25 %
Blind Butts, Parker dis 60&10 %
" Palmer dis 40&10 %
" Seymour dis 60&10 %
" Shepard dis 60 %
" Lull & Porter dis 60 %
" Nicholson dis 45&10 %
" Huffer dis 33⅓&10 %
" Garretson dis 60 %
" Clark's, Nos. 1, 3, 5, 40 and 50 dis 60 %
" " Nos. 2, 4, 4½, 6, 8, 10 dis 50&10 %
" Sargent's dis 70&5&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co. dis 20 %
D. R. Barton Tool Co. dis 20 %
Bradley's dis 25 %
Beatty's dis 20 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

Hart Mfg. Co. dis 50&10 %

0	1	2	3	4	5	6
$20.00	26.00	29.50	33.00	37.00	41 "0	45.00

Can Openers.
Messenger's Comet ₩ doz $3.00, dis 20 %
American ₩ doz $2.25, dis 50&5 %
Lyman's ₩ doz $3.75, dis 20 %
No. 4, French ₩ doz $2.25, dis 50 %
No. 5, Iron Handle ₩ doz $2.25, dis 50&5 %
Sprague's..Nos. 1 2 3 — ₩ doz $2.00 2.25 2.50 dis 25 %
Eureka ₩ doz $2.50, dis 10 %
Sardine Scissors ₩ doz $7.00, dis 40 @ 40&5 %
Star ₩ doz $5.00, dis 25 %

Caps—Percussion. ₩ 1000.
Hicks & Goldmark's G. D. & S. R. 37 @ 40c
" " E. B. 1-10 Ground 70c, dis 6 %
" " E. B. 1-10 Turned 65c, dis 5 %
" " D. W. P. 1-10 $1.40, dis 5 %
" " D. W. P. ¼ 1.35, dis 5 %
" " Colt's 1-10 70c, dis 5 %
Ely's E. B. 1-48, 58c.; 1-108, 70c. gold
" Double Waterproof, 1-48, $1.50; 1-108, $1.58c. gold
Colt's 1-108, 80c, gold

Cartridges.—Metallic dis 62½ %

Cards.—Horse and Curry dis 30&10 %
Cotton dis 10&10 %
Wool dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished ₩ doz $5.00, dis 30 %
" Iron, Steel Points ₩ doz $2.00, dis 45&5 %

Casters.
Bed dis 55 %
Plate and Shallow Socket dis 55 %
Deep Socket dis 40 %

Cattle Leaders.
Hotchkiss' Sons' dis 10&10 %
Humason, Beckley & Co.'s dis 60 %
Sargent's dis 60&10 %
Union Nut Co. dis 60&5 %

Chain.
Trace, 6⅝-10-2 by the cask, ₩ pair, gold, 50 @ 55c
" 7-10-2 by the cask, ₩ pair, gold, 55 @ 57c
German Halter Chain dis 30&5 % gold
" Coil dis 30&5 % gold
Galvanized Pump Chain ₩ lb 10½c
Jack Chain, Iron dis 55&10 %
" Brass dis 45&10 %

Chalk.
White ₩ gross 55c net
Red ₩ gross 75c net
Blue ₩ gross 90c net
White Crayons ₩ gross 13½c net

Chisels.
D. R. Barton Tool Co. (all kinds) dis 20 %
Socket Framing, Crossman dis 60&5&10 %
" " Buck Bros. new list, dis 17½ @ 20 %
" " Hart Mfg. Co., No. 1 dis 65&5&10 %
" " Merrill dis 60&10 %
" " Witherby Tool Co. dis 60&10 %
" " Douglass' dis 70 %
" Firmers, Crossman dis 60&10 %
" " Buck Bros. new list, dis 17½ @ 20 %
" " Hart Mfg. Co., No. 1 dis 65&5&10 %
" " Merrill dis 60&10 %
" " Witherby Tool Co. dis 60&10 %
" " Douglass' dis 70 %
" Corner dis 65&70 %
Tanged Firmers extra $5.00 @ $5.25 to £ gold
" " Butcher's $5.00 @ $5.25 to £ gold
" " Newbould's 5.50 to £ gold
" " Spear & Jackson's 5.00 to £ gold
" " Buck Bros (Shank) 5.25 to £ gold

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron dis 25 %
" Adjustable, Gray's dis 20 %
" " Lambert's dis 20 %
" " Snow's dis 40&5 %
" " Hammer's dis 15 %
" Cabinet, Sargent's dis 60&10 %
" Carriage Makers', Sargent's dis 60&10 %

Coffee Mills.
Board and Box dis 25 %
Increase Wilson's dis 25 %
Selsor's Pat. $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) dis 20 %
French Steel dis 20 %
The Swift dis 20 %

Compasses and Dividers dis 35&10 %
Bemis & Call Co.'s dis 35&10 %
Cook's dis 15 %
Excelsior dis 40 %
Miller's Patent dis 25&10 %

Coopers' Tools.
Bradley's dis 15 @ 20 %
Chas. E. Little dis 20 @ 25 %
D. R. Barton Tool Co. dis 20 %

Corkscrews.—Humason & B. dis 33⅓ %

Corn Knives and Cutters.
Bradley's dis 10 %

Crow Bars.
Cast Steel ₩ lb 9c net
Iron, Steel Points ₩ lb 5c

Crucibles.—Gautier & Co. ₩ No. 5½c

Curling Irons, &c.
Curling Irons dis 10 %
⅛, ⅝, ¾ in..$1.80, 2.00, 2.40 dis 10 %
Curling Tongs ₩ doz $6.50, dis 15 %
Pinching Irons ₩ doz 7.50, dis 20 %

Curry Combs.
Curry Comb Mfg. Co. dis 25&10 %
Fitch's (List of No. 240, $1) dis 30&10 %
Hotchkiss'& Kellogg's, Iron & Brass, old list dis 40&7½ %
Hotchkiss' Novelty dis 10&10 %
Rubber ₩ doz $2.00, dis 15 %
Wood Tooth (Fuller Bros.) ₩ doz $2.25, net

Clips, Axle.
Norway or Best dis 50 %
Superior dis 55 %

Cockeyes....1¼ in., 28c.; 1⅛ inch, 33c.; 1¾ in., 37c, net

Cocks.
Brass Racking dis 50 %
Lock and Globe dis 50 %
Lever Bibbs dis 50 %
Ale and Beer dis 40&45 %

Curtain Pins.—Silvered Glass..new list, dis 15 %

Cutlery.
Meriden Cutlery Co. (Table) net
Am. Miller Bro.'s Cutlery Co. dis 25 %
Naugatuck Cutlery Co. list net
New York Knife Co. (Pocket) dis 35&5 % cash
" " " (Table) net
Rogers Cutlery Co. net
Humason & Beckley Mfg Co. dis 25 %

Dippers.
Britannia ₩ doz $3.75 @ $4.25, net
Cocoa, Plain ₩ doz $3.25, dis 20 %
" Rimmed ₩ doz 3.75, dis 20 %

Dog Collars.
Embossed Gilt dis 20 %
Leather dis 30 %
Brass dis 25 %

Door Springs.
Torrey's Rod ₩ doz $2.00 @ $2.10, net
Gray's ₩ doz $2.00, net
Johnson's Rod ₩ doz 3.00, net
Gem (Coil)—
No. 1, Large, Japanned ₩ doz $3.50
No. 2, Medium, " ₩ doz 2.50 } dis 10 %
No. 4, Small, " ₩ doz 2.00
Challenge (Coil)— Nos. 9 7 6
Japanned ₩ doz $2.00 2.50 3.50
Coppered ₩ doz 4.00 4.50 5.00 } dis 10 %
Galvanized ₩ doz 3.50 4.00 4.50
Nickeled ₩ doz 5.50 6.00 7.00
Premium (Coil)— Nos. 1 2 3
Japanned ₩ doz $7.50 6.25 5.00 } dis 30 %
Nickeled ₩ doz 11.00 9.50 8.00
Star (Coil)—For Cop'd, Nickel-Plated, &c., see list.
No. 8, Small ₩ doz $2.00
No. 6, Medium ₩ doz 2.50 } dis 15 %
No. 7, Large ₩ doz 3.50
Philadelphia 5 in., $5.00; 8 in., $7.00, dis 30 %
Barker's Concealed dis 15 %

Drawing Knives.
Crossman's No. 1 dis 60&10 %
D. R. Barton Tool Co. dis 20 %
Hart Mfg. Co., No. 1 dis 65&5&10 %
Merrill dis 60&10 %
Nobles Mfg. Co. dis 15 %
Bradley's dis 25 %
Adjustable Handle dis 20 %
Witherby Tool Co. dis 60&10 %
Douglass' dis 70 %

Drills and Drill Stocks.
Blacksmiths' each $2.25 net
" Self-Feeding each $7.50, dis 10 %
Breast, P. S. & W. dis 25 %
Breast, aiken's dis 25&10 %
" Hotchkiss dis 10 %
" Wilson's dis 20 %
" Miller's Falls each $2.50, dis 25 %
Ratchet, Merrill's dis 20 %
" Ingersoll's (old list) dis 35 %
" Whitney's dis 20 %
" Weston's dis 20 %
" Moore's Triple Action dis 20 @ 25 %
Wilson's Drill Stocks dis 10 %
Automatic Boring Tools each $2.75, dis 20 %

Drill Chucks.
Danbury each $8.00, dis 30 %
Morse's Beach Patent dis 30 %
" Adjustable each $10.00, dis 30 %

Egg Beaters.
Dover ₩ doz $5.00, dis 20 %
National ₩ doz $4.50, dis 33⅓ %
Schofield ₩ doz $3.50

Emery.
Genuine Chester—Regular Nos. ₩ lb 6c } dis 10 %
" " Flour and FF ₩ lb 4c }
Washington Mills—Regular Nos. ₩ lb 8c
" " Flour ₩ lb 5c
Wellington Mills, Grain ₩ lb 10c net
" " Flour ₩ lb 8c net

Enameled and Tinned Ware.
Kettles dis 40 @ 50 %
Sauce Pans dis 30 @ 35 %
Glue Kettles dis 30 @ 35 %
Tinned Sauce Pans dis 30 @ 35 %

Escutcheons.
Door Lock Same discounts as Door Locks
Brass Thread dis 60&10 %
Wood dis 25 %

Faucets.
Fenn's dis 50 %
Fenn's Cork Stops dis 40 %
Star dis 55&10 %
Frary's Patent Petroleum dis 20&10 %
Wood and Metallic dis 40 %
" Cork Lined dis 65&10 %
Enterprise Mfg. Co., Self-Measuring dis 20 %

Felloe Plates. ₩ lb 15c, dis 40&10 %

Files.
American File Co. $5.00 to £ currency, dis 30 %
Arcade File Works $5.00 to £ currency, dis —
Auburn " 5.00 to £ currency, dis —
C. R. Paul's 5.00 to £ currency, dis —
Heller & Bros. $5.00 to £ currency, dis 15 @ 20 %
Madden & Cockayne File Co. $5.00 to £ cur., dis 25 %
Jowitt's $4.50 to £ gold
J. & Riley Carr 4.50 to £ gold
Stubs' 7.50 to £ gold
Butcher's 4.50 to £ gold
Walter Spencer & Co.'s "Diamond" 4.50 to £ gold
Fisher's 4.75 to £ gold
Moss & Gamble 4.75 to £ gold
Thos. Turner & Co. (Peter A. Strasse & Co.) 4.50 to £ gold
" " Horse Rasps 4.75 to £ gold
H. Disston & Sons (new list) dis 30 %
Limet & Co. (French) $4.25 to £ gold
Boyton's Cant dis 40 %
Rothery dis 25 %

Fluting Machines.
Mrs. Knox, No. 1876 each $2.75 to $3.00 net
Knox Imperial, 1877 $5.20, dis 30&10&10 %
Knox, 4-inch Rolls $2.50 each net
" 6 " " 3.00 each net
" 8 " " 4.50 each net
Peerless, 4-inch Rolls 4.00 each net
" 5 " " 4.75 each net
Improved Knox (Climax), 4-inch 2.65 each net
" " 6 " " 3.15 each net
" " 8 " " 4.00 each net
Eagle, 3¼-inch Roll $18.00 ₩ doz, dis 5 %
5⅝ " " 24.00 ₩ doz, dis 5 %
Empire $4.00 each net
Eureka, No. 1, 7-inch Roll 0.75 each net
" No. 2, 5-inch Roll 5.00 each net
Crown, 4¼-in. Roll, $2.35; 6-in., $2.75; 8in., 4.00 each net
Domestic Fluter 1.50 each net
Geneva Hand Fluter 15.00 ₩ doz net
Combined Fluter and Sad Iron ₩ doz 15.00, dis 10 %

Fluting Scissors dis 35&10 %

Forges.
"Empire" (W. P. Kellogg & Co.) dis 20 %
Keystone Portable Forge Co. dis 20 %

Forks.
Hay, Manure and Spading dis 25 %
Plated A 1 dis 40&5 %
" Reed & Barton dis 40&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co. dis 20 %

Fry Pans.
Burnished, P. S. & W., new list dis 60 %

No.	0	1	2	3	4	5	6	7	8	9
Doz.	$3.00	$3.75	4.35	4.75	5.25	6.00	7.00	8.00	9.00	

Gauges.
Marking dis 45&10 %
" Star dis 35 %
Wire dis 10 %
" Smith's Patent ₩ doz $18.00, dis 40 %

Gimlets.
Nail and Spike dis 40 %
Bee " Gimlets ₩ gross $12.00, dis 45 %
"Eureka" Gimlets dis 40 %
Double Cut, Shepardson's dis 30 %
" " Hartwell's dis 40 %
" " Ives' dis 33⅓ %
" " Douglass' dis 25&10 %

Glue Pots.
Tinned and Enameled dis 35 @ 40 %
Family, Howe's "Eureka" dis 25 %
" P. & C.'s "Handy" dis 25 %

Grindstone Fixtures.
Sargent's Patent dis 70&10&10 %
Reading Hardware Co (New list) dis 40&10 %
Hart Mfg. Co., Nos 9 to 11 dis 75&7½&10 %
Rick Bros. dis 45&5 %

Hammers.
Humason & Beckley Mfg. Co. dis 33⅓ %
Maydole's (New list, Jan. 1, '77) dis 15 %
Henry Hammonds' (New list, Jan. 1, '77) dis 25 %
Cheney's Steel Face and Claw dis 10 %
" all Steel dis 20&10 %
Verree dis 5 %
Magnetic Tack dis 25&10 %
Warner & Noble's dis 10 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4.00 ₩ pair } dis 25 %
" " Leg Irons, $6.50 ₩ pair }
Providence Tool Co.'s Hand Cuffs, $15.00 ₩ doz } dis 10 %
" " Leg Irons, $25 ₩ doz }

Handles.
Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz.	$0.80	1.00	1.18	1.35	1.50	dis 60&10 %

Roggin's Latches 33c net
Bronzed Iron Drop Latches ₩ doz $1.00 @ $1.25 net
Jap'd Store Door Handles—Nuts, $1.80; Plate, $1.20;
" no Plate, 60c
Wrought Chest dis 60&10 %
Surface Chest, Sargent's list dis 60&10&10 %
Flush Chest dis 60&10&10 %
Lifting dis 60&10 %
Saw and Plane dis 25&10 %
Boynton's X Cut (Loop) dis 20 %
" (Centennial) dis 15 %
Hammer and Hatchet dis 10 %
North Carolina Handle Co. dis 15 %
Brad Awl ₩ gross $3.75, dis 25&10 %
Hickory Firmer Chisel, assorted, ₩ gross $5.25
" " " large, " 6.50
Apple " " assorted, " 6.00
" " " large, " 7.50
Socket " " assorted, " 4.50 } dis 40 %
" Framing " assorted, " 7.00
File, assorted, ₩ gross 3.50
Auger, assorted, ₩ gross 6.00
" large, " 7.00
Patent Auger, Ives' dis 25&10 %
" Douglass' ₩ set $1.25, dis 10 %
" Swan's ₩ set $1, dis 20&10 %

Hangers.
Barn Door dis 70&10 %
"Anti-Friction," No. 1, $1.25; No. 2, $1.50 ₩ pr., dis 40&10 %
Novelty dis 40 %
Challenge dis 50 %
Climax dis 40 %

Harness Snaps.
Henshaw's..List of 1¼ changed to $14.00, dis 45 @ 50 %
Judd's " " " 14.00, dis 50 %
Fitch's (Bristol) " " " 14.00, dis 45&50 %
Hotchkiss' dis 10 %
Andrews' dis 45 %
Sargent's dis 60&10 %
New York Wire dis 20&20 %
"German" dis 20&10 %

Hatchets.
Isaiah Blood dis 15 %

Shingling, Nos. 1 2 3	₩ doz	$7.25	$8.00	$8.75
Claw, Nos. 1 2 3	₩ doz	7.75	8.50	9.25
Lathing, Nos. 1 2 3	₩ doz	7.50	8.00	8.50

Hunt's dis 25 %

Shingling, Nos. 1 2 3	₩ doz	$7.25	$8.00	$8.75
Claw, Nos. 1 2 3	₩ doz	7.75	8.50	9.25
Lathing, Nos. 1 2 3	₩ doz	7.50	8.25	9.00

Hurd's dis 30&10 %

Shingling, Nos. 1 2 3	₩ doz	$8.00	$8 50	$9.00
Claw, Nos. 1 2 3	₩ doz	9.00	9.50	10.00
Lathing, Nos. 1 2 3	₩ doz	8.00	8.50	9.00

Simmon's dis 35 %

Shingling, Nos. 0 1 2 3	₩ doz	$7.50	$8.00	$8.50 $9.00
Claw, Nos. 1 2 3	₩ doz		9.00	9.50 10.00
Lathing, Nos. 1 2 3	₩ doz		8.00	8.50 9.00
Broad, Nos. 1 2 3 4	₩ doz	9.00	10.00	12.00 14.00
Nos. 5 6 7 8	₩ doz	16.00	18.00	20.00 22.00

Collins' dis 10 %

Shingling, Nos. 1 2 3	₩ doz	$6.00	$6.50	$7.00
Claw, Nos. 1 2 3	₩ doz	6.50	7.00	7.50
Lathing, Nos. 1 2 3	₩ doz	6.00	6.50	7.00

Ten Eyck Axe Mfg. Co. dis 35 %

Shingling, Nos. 1 2 3	₩ doz	$8.00	$8.50	$9.00
Lathing, Nos. 1 2 3	₩ doz	8.00	8.50	9.00
Claw, Nos. 1 2 3	₩ doz	9.00	9.50	10.00
Broad, Nos. 2 4 5	₩ doz	13.00	14.50	16.00
" Nos. 6 7 8	₩ doz	18.00	19.50	22.00
" No. 9	₩ doz	25.00		

D. R. Barton Tool Co. dis 20 %

Shingling, Nos. 1 2 3	₩ doz	$11.00	$10.50	$10.00
Lath, Nos. 1 2 3	₩ doz	10.50	10.00	9.50
Half Hatchets, Nos. 1 2 3	₩ doz	11.00	10.50	10.00

J. P. Perree & Co. dis 5 %

Shingling, Nos. 1 2 3	₩ doz	$7.00	$7.50	$8.00
Claw, Nos. 1 2 3	₩ doz	7.50	8.00	8.50
Lathing, Nos. 1 2 3	₩ doz	7.00	7.50	8.00

Underhill's dis 20 %

Shingling, Nos. 1 2 3	₩ doz	$7.25	$8.00	$8.75
Claw, Nos. 1 2 3	₩ doz	7.75	8.50	9.25
Lathing, Nos. 1 2 3	₩ doz	12.00	11.00	13.00

M. H. Jones & Co. dis 25 %

Shingling, Nos. 1 2 3	₩ doz	$8.00	$8.50	$9.00
Half Hatchets, Nos. 1 2 3	₩ doz	8.00	8.50	9.00
Claw, Nos. 1 2 3	₩ doz	9.00	9.50	10.00
Lathing, Nos. 1 2 3	₩ doz	8.00	8.50	9.00
Broad, Nos. 2 3 4	₩ doz	11.00	13.00	14.50
" Nos. 5 6 7	₩ doz	16.50	18.00	19.50

Empire Hatchets, M. H. Jones & Co. net

Shingling, Nos. 1 2 3	₩ doz	$4.75	$5.00	$5.25
Lath Nos. 1 2 3	₩ doz	4.75	5.00	5.25
Half Hatchets, Nos. 1 2 3	₩ doz	4.75	5.00	5.25
All pol. Sh'gling, Nos. 1 2 3	₩ doz	5.25	5.50	5.75
Solid Steel Lath, Nos. 1 2 3	₩ doz	7.25	8.50	7.75

Hay Knives.
"Lightning" ₩ doz $30.00 net
Wadsworth's dis 30 %

Hinges.
Gate, Western ₩ doz $6.25, dis 60&10 %
" N. E. ₩ doz $10.13, dis 60&10 %
" N. Y. State ₩ doz $7.20, dis 60&10&10 %
" Clark's No. 1 ₩ doz $6.00, dis 45 %
" Automatic ₩ doz $12.50 dis 20&10 %
Rolled Plate dis 60&10 %
Rolled Raised dis 60&10 %
Wrought Strap and T dis 60 %
Providence Plate { 6 to 10 in. 11c ₩ lb; over 10 in. 9½c ₩ lb } dis 40&10 %
Screw Hook and Strap { 8, 10, 12 in., 12c; 14 to 36 in., 9½c } dis 40&10 %
Heavy Welded Hook { 8 to 12 in., 11 c; 14 in. & up, 9½c } dis 30 %
Screw Hook and Eye { ¾ to 1 in., 11 c; ⅝ in. 12½c; ½ in. 13 c } net

Hoes.
Solid Shank, C. S. ₩ doz $8.00, dis 40 %
Socket ₩ doz 9.00, dis 40 %
Riveted Eye ₩ doz 4.75, dis 40 %
Grub dis 30 %
Planters' dis 20 @ 25&10 %
Scovill Pattern dis 20 @ 30 %
Lane's C. S. Crescent Planters, Amer. Pat'n..dis 20&5 %
" Scovill Pattern dis 20 %
Handled Solid C. S. Shank dis 35 %
Planters', Handled dis 35 %
Scovill Pattern, Handled dis 35 %

Hooks.
Bird Cage, Sargent's list dis 60&10 %
Cotton dis 50 %
Belt dis 60&10 %
Bench—Hotchkiss', $5.00 ₩ doz dis 10 %
" Weston's, No. 1, $8.00; No. 2, $7.00 ₩ doz. net
" McGill's, $3.00 ₩ doz. dis 10 %
" Skinner's, $6.25 per doz. dis 20 %
Clothes Line, Hart's list dis 60&10&5&10 %
" " Sargent's list dis 60&10&10 %
" " Reading list dis 33⅓&5&10 %
Ceiling { Hart's list dis 70&10 %
Harness { Sargent's list dis 60&5&10 %
" { Reading list dis 40&10 %
Coat and Hat, Hart's list dis 65&5&10 %
" " Sargent's list dis 60&10&10 %
" " Reading dis 40&10 %
Wrought Staples and Hooks and Staples dis 75 %
" Staples, Stanley's list dis 40 %
Wire Screw Hooks and Eyes dis 70&5&30 %
Grass dis 30 %
Whiffletree, Patent dis 40 %
Hooks and Eyes—Malleable Iron dis 60&10&10 %
" " Brass dis 60&10&10 %

Horse Nails. dis 20 %

	Nos. 5	6	7	8	9	10
Ausable ₩ lb	30c	27c	25c	24c	23c	22c
" P't'd and Pol'd.	31c	28c	26c	25c	24c	23c
" " and Blued	31c	28c	26c	25c	24c	23c
Cortland	31c	28c	26c	24c	23c	21c
" P't'd & Blued.	31c	28c	26c	25c	24c	23c
Buffalo Forged	31c	28c	26c	25c	24c	23c
Globe, P't'd and Pol'd.	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin.	28c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin.	30c	27c	25c	24c	23c	22c
Perkins' P't'd—Black.	26c	23c	21c	20c	19c	18c
Perkins' Pointed and Polished	27c	24c	22c	21c	20c	19c
Perkins' Pointed and Blued	27c	24c	22c	21c	20c	19c
Putnam Hammer, P't'd	32c	29c	26c	25c	24c	23c
Vulcan P't'd & Blued	31c	28c	26c	25c	24c	23c
North Western Plain	30c	27c	25c	24c	23c	22c

Screws.
Flat H'd Iron, list Sept. 1, '75, R. & E. Mfg. Co. dis 60&10 %
" " " Am. Sc. Co.... dis 60&10 %
Round Head Iron " " " ..... dis 50 %
Flat Head Brass, list Sept. 1, '75, Am. Sc. Co..... dis 55 %
Round Head Brass, list Sept. 1, '75, Am. Sc. Co.. dis 40 %
Brass and Silver Capped..... dis 40 %
Lag or Common Coach, new list Mch. 1, '76, dis 65@70 %
Coach, Patent Gimlet Point, list Jan. 1, '75, dis 40@50 %
Bed..... dis 10 %
Japanned, list of Plain Screws..... dis 45 %
Machine, Flat Head, Iron, Am. Screw Co..... dis 10 %
" Round Head, Iron, " " ..... net
Nettlefold's Brass..... dis 60@60&5 %
Bench, Iron..... dis 60&10&10 %
" Wood, Beach..... ₱ doz $3.00, net
" " Hickory..... dis 20&10 %
Hand..... dis 10 %
Hand Rail, Sargent's..... dis 55&10 %
" Humason, Beckley & Co.'s..... dis 40&5 %
Jack, Bell Bottom..... dis 15 %

Scythes.
Blood's German Steel, Grass..... ₱ doz $10.00
" Cast, " " ..... ₱ doz 11.00 — dis $1.50 from list
" Silver " ..... ₱ doz 12.00
" German " Grain..... ₱ doz 14.00
" Cast " ..... ₱ doz 15.00
" Excelsior and Granger.. ₱ doz 11.00
" Young America..... 10.50 — dis $1.50 from list
" Silver Clipper..... 13.00
Wadsworth's Grass..... dis 30 %
" Bush..... dis 20 %
Scythe Snaths..... dis 20 %

Shears and Scissors.
Cast Steel..... dis 75 & 10 %
" Iron..... dis 55 %
Seymour's Straight Trimmers..... dis 05 %
" Scissors..... dis 50 %
Pruning..... ₱ doz $5.50 @ $6.00, net
Barnard's Lamp Trimmers..... ₱ doz $3.75

Shenves.
Sliding Door, M. W. & Co., list..... dis 35&10&2 %
" R. & E. list..... dis 50&2 %
" Patent Roller..... dis 25&20 %
" Hatfield's..... dis 50&2 %
" Russell's Anti-Friction..... dis 50&2 %
Sliding Shutter, R. & E. list..... dis 50 %
" " Sargent's list..... dis 55&10 %
Moore's Anti-Friction..... dis 33⅓ %

Shovels and Spades.
Ames..... dis 30 %
Rowland's..... dis 50 %
Kimball Shovel Co..... dis 20 @ 20&5 %
Old Colony..... dis 30 %
Middleboro' Shovel Co..... dis 30 %
Remington's (Lowman's Patent)..... dis 30 %
Dunning's Shovels and Scoops..... dis 20&7½ %

Shovels and Tongs.
Iron and Brass Head, R. & E. list..... dis 50&2 %
" " Hart's..... dis 55&10 %
Polished Steel..... dis 50&2 %

Slates.
Square Frames, Round Cornered, by case..... dis 70 %
Less than a case..... dis 65&10 %

Spokes.
North Carolina Handle Co..... dis 20 %

Spoke Shaves.
Defiance Metallic..... new list, dis 25&10 %
Iron..... dis 33⅓&10 %
Wood..... dis 30 %
Bailey's..... dis 25&10 %

Spoke Trimmers.
Bonney's..... ₱ doz $10.00, dis 40 %
Stearn's..... ₱ doz $10.00, dis 40 %
Ive's..... No. 1, $15.00; No. 2, $12.00 ₱ doz, dis 33⅓&10 %
Douglass'..... ₱ doz $9.00, dis 20&10 %

Spoons.
Tinned Iron..... dis 10 %
By the case..... dis 20 %
Basting..... dis 10 %
Britannia..... dis 55 @ 60 %
" Boardman's..... dis 55 %
Derby Silver Co..... dis 40&5 %
Rogers & Bro., A 1..... dis 40 %
Reed & Barton..... dis 40 %
Rogers Cutlery Co..... dis 40&5&5 %
Hall & Elton..... dis 40&5 %
Holmes, Booth & Haydens..... dis 40&5 %
German Silver (Hall & Elton)..... dis 25 %
Tin (P. S. & W.), Teas..... $1.50 ₱ gross, net
" " Tables..... $2.50 ₱ gross, net
Tin (Cowles Hdw. Co.)..... dis 10 %
" " " case lots..... dis 20 %

Stocks and Dies. ..... dis 5&10 %

Stone.
Hindostan Stone..... ₱ lb 6c
" Ax Stone..... ₱ lb 8c — dis 25&10 %
" Slips..... ₱ lb 10c
Sand Stone..... ₱ lb 6c, dis 25&10 %
Washita Stone..... No. 1, ₱ lb 30c, net
" No. 2, ₱ lb 25c, net
" Slips..... No. 1, ₱ lb 60c, net
Arkansas Stone..... No. 1, ₱ lb $1.35, net
" Slips..... No. 1 ₱ lb $2.50, net
Grindstones, Family, Loring's..... dis 10 %

Stove Polish.
Joseph Dixon's..... ₱ gross $6.00, dis 5 %
Gem..... ₱ gross $4.50, dis 5 %
Gold Medal..... ₱ gross $6.00, dis 25 %
Rising Sun..... ₱ gross $5.75, net

Squares.
Steel..... dis 50 %; full cases, dis 50&10 %
Iron..... dis 50 %; full cases, dis 50&10 %
Nickel Plated..... add $2.50 @ $4.00 ₱ doz, net
Try Squares and T Bevels..... dis 45&10 %
Star Try Squares and Bevels..... dis 35 %
Diston's Try Squares No. 1..... dis 30 %
" " No. 2..... dis 45 %
" " Improved, Nos. 1 and 2.. dis 30 %
Winterbottom's Try and Miter..... dis 20&10 %

Tacks, Brads, &c.—List of January 1, 1876.
Tacks, Half Weight, American..... dis 75&20
" Full " " ..... dis 50&20
" Half " Swedes..... dis 65&20
" Full " " ..... dis 30&20 — dis 10 % for cash
" Carpet, Am. and Swedes.. dis 20&20
" " Leather Head..... dis 20
" Copper..... 52c, dis 20
Brads, Half Weight..... dis 50&20
Shoe Nails—
4-8ths and longer, 9c; 3½-8ths, 9½c ₱ lb, dis 20&10 %
Trunk, Clout and Finishing Nails—

½	⅝	¾	⅞	1	1¼ in. and over.
25	20	17	15	13	11c ₱ lb, dis 20&10 %

Double-Pointed Tacks..... dis 40&5 %

Tap Borers.
Common and Ring..... dis 20&10 %
Ives' Tap Borers..... dis 10&10 %
Enterprise Mfg. Co..... dis

Tapes, Measuring.
American Flask and Cap Co..... dis 20 %
Eddy's..... dis 20 %

Tea Trays.
American Tea Tray Co..... dis 15 %

Thermometers.
Tin Case..... dis 60&5&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion)..... dis 20 %
Wood Bottom..... ₱ doz $12.00, dis 30&10 %
All Iron..... ₱ doz $10.50, dis 40&5 %
Nashua Lock Co.'s..... ₱ doz $18.00, dis 50 %

Toe Calks.
Winsted..... ₱ lb 10c. dis 5 @ 7½ %

Tinners' Tools and Machines.
P. S. & W..... dis 10 %

Traps.
Game, Newhouse..... dis 30 %
" Newhouse Pattern..... dis 60 %
" Blake's Patent..... dis 40 %
Mouse, Wood, Choker..... ₱ doz holes, 15 @ 16c
" Patent Choker (Union Nut Co)..... ₱ doz holes, 16 @ 18c, net
" Round Wire..... ₱ doz $1.50, dis 1
" Square " ..... ₱ doz $2.00 to $2.50, net
" Cage " ..... ₱ doz $2.50, dis 10 %
" Patent Self Setting..... ₱ doz holes, 25c, net
" Catch-em-alive..... ₱ doz $4.00, net

Trowels.
Lothrops Brick and Plastering..... dis 10 %
Diston's Brick and Plastering..... dis 20 %
Peace's Plastering..... dis 20 %
Clement & Maynard's..... dis 20 %
Rose's Brick..... dis 5 %
Brades' Brick..... gold, dis 20 %
Worrall's Brick and Plastering..... dis 20 %
Garden..... dis 25 %

Triers.
Butter and Cheese..... dis 25 %

Vises.
Solid Box, Trenton..... 40 to 160 lbs., 12½c, net
" Wilson's..... 30 to 160 lbs., 18c, 160 lbs. and over, 22c, dis 33⅓ %
" Peter Wrights..... 15½c, gold
Parallel, Parker's..... dis 20 %
" Wilson's..... dis 30&10 %
" Sargent's..... dis 55&10 %
" Trenton..... dis 25 %
" Rackus and Union..... dis 25 %
" Merrill's..... dis 15 %
" Fisher & Norris..... dis 15&10 %
" Buffalo..... dis 25 %
" Stevens'..... dis 25 %
" Simpson's Adjustable..... dis 25 %
Saw Filers, Bonney's..... ₱ doz $20.00, dis 25 %
" Stearn's..... ₱ doz $20.00, dis 25 %
" Hopkins'..... ₱ doz $17.50, dis 10 %

Wheel Barrows.
Canal (Pugsley & Chapman..... new list, dis 30 %
Coal, Garden and Stone (Pugsley & Chapman).. dis 30 %
Jacob's Pat. Self-Oiling R. R. and Canal..... dis 25 %

Well Wheels.—Revised list..... dis 60&10 %

Wire.
Brass and Copper..... List of Jan. 1, 1877, dis 10 %
Bright and Annealed..... Nos. 0 @ 18, dis 55 @ 57½ %
" " ..... Nos. 19 @ 26, dis 60 @ 62½ %
" " ..... Nos. 27 @ 36, dis 62½ @ 65 %
Coppered..... Nos. 0 @ 18, dis 52½ @ 55 %
Galvanized, Nos. 0 to 6..... ₱ lb 10c, dis 30 @ 35 %
" Nos. 7 to 18..... market list, dis 30 @ 35 %
Tinned, Nos. 0 to 18..... dis 35 @ 40 %
Cast Steel..... dis 20 @ 25 %
Tinned Broom Wire, Nos. 18 to 25..... dis 42½ @ 45 %
Galvanized Telegraph, Nos. 7 to 9..... ₱ lb 9c
" " Nos. 10 and 11..... ₱ lb 10c
" " No. 12..... ₱ lb 10½c
Annealed Fence, Nos. 8 and 9..... dis 57½ @ 60 %
" Grape, Nos. 10 to 14..... dis 57½ %
Fence Staples..... ₱ lb 7 @ 7½c
Fence Staples, Galvanized..... ₱ lb 9½ @ 10c
Stubs Steel Wire..... $7.00 to £ gold
Japanned Barb Fence..... ₱ lb 15c
Galvanized " ..... ₱ lb 18c
Steel Music Wire, Nos. 12 to 27..... ₱ lb 10c
Judd's Picture Wire..... dis 50 %
Clothes Line Wire, Galvanized..... ₱ coil 43 @ 50c, net

Wrenches.
American Adjustable..... dis 45 %
Baxter's Adjustable "S," New list May 1, '76.... dis 20 %
" Diagonal, " " ..... dis 20 %
Collins & Co.'s..... dis 45 %
Coes' Genuine..... dis 50&5 %
" Pattern (Wrought)..... dis 50&10 %
" " (Malleable)..... dis 75&10 %
Girard..... dis 50&10 %
Hull & Belden's "Climax"..... dis 25 %
Knight's Patent..... dis 25 %
Lindsay's " ..... dis 25 %
Taft's Pattern..... dis 75&10 %
Davis' Patent Duplex..... new list, dis 25 %
Bemis & Call's Patent Combination..... dis 20&5 %
" " Merrick's Pattern..... dis 25&2½ %
" " Briggs' Patent..... dis 20&5 %
Aiken Pocket (Bright)..... $8.00, dis 40 %

Wringers. ..... Per doz.
Universal, without Cog Wheels..... $54.00
" with Cog Wh'ls, No. 2½, small fam'y size 65.00
" " " No. 2, usual " 66.00
Crown No. 2..... 54.00
" No. 2½..... 60.00
" No. 66.00
Climax No. 2..... $71.00 — Less $2.00 ₱ doz. for cash before shipment.
" No. 1½..... 79.00
XXX Universal No. 2..... 71.00
" No. 1½..... 79.00
Household, no Cog Wheels..... 54.00
Sherman, with " 63.00
Eureka, no " 90.00
Reliance, with " 63.00
Novelty, No. 10, with Cog Wheels..... 63.00
" No. 2, " " 66.00
" No. 22, " " 70.00
Excelsior, No. A, with Folding Bench..... 84.00
" No. E, for Set Tubs..... 48.00
Keystone No. 1, Wood Frame, no Gear..... 50.00
" No. 2, Iron " 48.00
" No. 2½, Wood " Purchase Gear..... 60.00
" No. 10, Wood " Common Gear..... 57.00
Peerless, No. 2..... 60.00
" No. 3..... 74.00

Stamped Tinware.
Common Stamped Ware..... dis 35 %
Stamped Deep and Retinned Ware..... dis 45 %

METALS.

IRON.—DUTY: Bars, 1 to 1½c. ₱ lb; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₱ lb; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₱ ton; Polished Sheet, 3c. ₱ lb; Wrought Scrap, $8 ₱ ton; Cast Scrap, $6 per ton. Railroad, 70c. ₱ 100 lbs. Boiler and Plate, 1½c. ₱ lb.

Pig Iron—AMERICAN.
Foundry No. 1..... ₱ ton $18.00 @ 19.00
" No. 2..... ₱ ton 17.00 @ 18.00
Gray Forge..... ₱ ton 16.00 @ 17.00

SCOTCH.
Glengarnock..... ₱ ton 25.00 @ 25.50
Eglinton..... ₱ ton 24.00 @ 24.50
Coltness..... ₱ ton 26.50 @ 27.00

Rails.
Iron, at mill..... ₱ ton $33.00 @ 37.00
Steel, " ..... ₱ ton 42.00 @ 45.00
Old Rails..... ₱ ton 19.00 nominal

Scrap.
Wrought Scrap, from yard..... ₱ ton 22.00 @ 24.00

Bar Iron, from Store.
Common Iron:
⅝ to 2 in. round and square..... ₱ lb 1.8 @ 1 9c
1 to 6 in. x ⅜ to 1 in..... ₱ lb 1.8 @ 1 9c
Refined Iron:
⅝ to 2 in. round and square..... ₱ lb 2 @ 2.1c
1 to 6 in. x ¼ to 1 in..... ₱ lb 2 @ 2.1c
1 to 6 in. x ⅜ and 5-16..... ₱ lb 2.2 @ 2.3c
Rods—⅝ and 11-16 round and square..... ₱ lb 2.1 @ 2.2c
Bands—1 to 6x12 to 3-16..... ₱ lb 2.5 @ 2.6c
Swedish Iron:
Ordinary sizes..... 5c

Sheet Iron.

	Common American.	R. G. American.
Nos. 10 to 20	₱ lb 3 c	4 @ 4¼c
21 to 24	₱ lb 3¼c	4 @ 4¼c
25 to 26	₱ lb 3½c	4¼ @ 4½c
27	₱ lb 3¾c	4¼ @ 4½c
28	₱ lb 4 c	4¾c
Galvanized, 14 to 20, prime	₱ lb 7¼c; 2d qual,	₱ lb 6 c
" 21 to 24, "	₱ lb 8 c; "	₱ lb 6½c
" 25 to 26, "	₱ lb 8½c; "	₱ lb 7 c
" 27 "	₱ lb 9 c; "	₱ lb 7½c
" 28 "	₱ lb 9½c; "	₱ lb 8 c

Patent Planished..... ₱ lb A, 11c; B, 9½c
Russia, Nos. 8 to 26..... ₱ lb 11½ @ 12c
American Cold Rolled..... ₱ lb 4½c

COPPER.—DUTY: Pig, Bar and Ingot, 5c; Old Copper, 4c ₱ lb; Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.
American Ingot..... ₱ lb 19 @ 19¼c
English " ..... ₱ lb

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.
Braziers' Copper, ordinary sizes, over 16 oz., ₱ sq. ft..... ₱ lb 30c
Braziers' Copper, ordinary sizes, 16 oz. and over 12 oz., ₱ sq. ft..... ₱ lb 32c
Braziers' Copper, 12 oz., ₱ sq. ft..... ₱ lb 34c
Circles less than 24 in. in diameter..... ₱ lb 33c
Circles 24 in. diameter and over..... ₱ lb 36c
Segment and Pattern Sheets..... ₱ lb 33c
Locomotive Fire Box Sheets..... ₱ lb 30c
Sheathing Copper, over 12 oz. ₱ sq. ft..... ₱ lb 26c
Bolt Copper..... ₱ lb 30c
Copper Bottoms..... ₱ lb 30c net
No Copper is Sheathing except 14x48 inches, and not to exceed 34 oz. to the sq. ft.

TINNING.
14x48, by the case..... ₱ sheet 6c
14x48, less than case..... ₱ sheet 8c
For tinning both sides, double the above amount.

O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier.. ₱ lb 36c — By the case. ₱ lb 35c
12 oz. and lighter..... ₱ lb 39c " " ₱ lb 38c

Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
14 and 16 oz. and heavier. ₱ lb 38c By the case. ₱ lb 39c
(And all sizes not over 20 in. wide.)
30x60.
14 and 16 oz. and heavier..... ₱ lb 40c
12 oz..... ₱ lb 43c

Brass.
Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.
BRASS MANUFACTURERS' PRICE LIST.
January 1, 1877.
Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c ₱ lb.

HIGH BRASS.
All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in..... 30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive..... 34c
All Nos. to No. 26, inclusive, and widths over 20 to 30 in., inclusive..... 37c
½c. ₱ lb advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at... 50c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c
Printers' Rules..... 44c
Sheets wider than 30 in. and under 40 in..... 45c
" " 40 in. and over..... 47c
Circular Sheets, in diam. from 4 in. to 14, inclusive. 41c
" " over 14 " 20, " ..45c
" " " 20 " 30, " ..48c
" " " 30 " 40, " ..51c
" " 40 in..... 54c

LOW BRASS.
4c ₱ lb more than High Brass.
Gilding Metal, 8c ₱ lb more than High Brass.
Platers' or Gold Metal — In Bars..... 46c; Sawed..... 49c; Planed or Polished..... 52c

FOR SLITTING.
Metal in width 2 in. to ½ in. to No. 28, inclusive, 1c. ₱ lb advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ₱ lb advance.
Metal, in width 1 in. to ⅛ thinner than No. 28, 3c ₱ lb advance.
Metal, in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c. ₱ lb advance.
Metal, in width ⅛ in. to ¼ thinner than No. 28, 5c. ₱ lb advance.
Metal, ¼ in. in width and less, 10c. ₱ lb advance.
Any of the above widths cut to particular lengths, add 7c. ₱ lb.

GERMAN SILVER MARKET METAL AND WIRE.

per cent., 12 n., to No. 26	Market Metal.	Wire.
	$0.60	$0.85
6 " " "	.68	.95
10 " " "	.84	1.15
15 " " "	1.04	1.40
18 " " "	1.16	1.55

German Silver Sheets over 12 in. wide and weighing more than 16 lbs., $2.25 ₱ lb.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₱ lb on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers, at 50c ₱ lb additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.34	$0.38	$0.45
No. 21	.35	.39	.46
No. 22	.36	.40	.47
No. 23	.37	.41	.48
No. 24	.39	.43	.50
No. 25	.42	.46	.53
No. 26	.44	.48	.55
No. 27	.46	.50	.57
No. 28	.49	.53	.60
No. 29	.52	.56	.63
No. 30	.55	.59	.66
No. 31	.59	.63	.75
No. 32	.63	.67	.81
No. 33	.67	.71	.90
No. 34	.71	.75	1.00

Spring Wire 2c ₱ lb advance.
Flat, Square and Half Round Wire 5c ₱ lb advance on Round Wire.
Fancy Wire not less than 10c ₱ lb advance of Round Wire.
Brass Rods, No. 8 and smaller not less than 2 feet lengths, 45c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 40c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents per ₱ lb extra for spooling on 1 ₱ lb spools.

MISCELLANEOUS.
Common Plain Brass Pail Ears..... $0.44
Brass Door Rail..... .45

SCRAP.
High Brass Scrap..... 16c
Low " 13c
Gilding..... 20c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING. ₱ lb
Plain to No. 20 inclusive, above ¼ in. to 3 in..... $0.40
" above 3 in..... .50
Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.
Plain, ¼ inch..... .78
" ⅛ " 1.10
" 3-16 " 1.60
All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20.....
English, Scotch and Extra Patterns Fancy Tubing to No. 20..... .53
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ¼ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ¾ in., 25 cents per pound advance.

ZINC TUBING.
Plain..... .28
Fancy..... .31
Scotch and Extra Patterns..... .34

GERMAN SILVER TUBING.
4 Per cent..... .85
6 " ..... .95
9 " 1.10
12 " 1.25
15 " 1.40
18 " 1.45
20 " 1.55
20 " 1.56

STEEL.—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents ₱ lb., or under, 2¼4 cents; over, 7 cents, and not above 11, 3 cents ₱ lb; over 11, 3½ cents ₱ lb., and 10 % ad val. Railway Bars, 1¼ cents ₱ lb. Railway Bars, in part Steel, 1 cent ₱ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

Tool	15c
Spring	7c
Homogeneous	12½c
Boiler Plate	8c
Tire	5½c
Machinery (round and square)	9c
File	9c
Sheet	11 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
" gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₱ lb 18 @ 19c
Tool, extra fine	₱ lb 40 @ 75c
Spring	₱ lb 10 @ 11c
Machinery	₱ lb 10 @ 11c
Hammer	₱ lb 12 @ 13c
Gun or Homogeneous	₱ lb 14 @ 16c

English Steel.—Payable in gold, net.

Best Cast	₱ lb 17¾c
Extra Cast	₱ lb 18¾c
Round Machinery, Cast	₱ lb 10¼ @ 11½c
Swaged, Cast	₱ lb 10½c
Best Double Shear	₱ lb 17¾c
Blister, 1st quality	₱ lb 14¾c
" 2d quality	₱ lb 13c
German Steel, Best	₱ lb 11½c
" 2d quality	₱ lb 10½c
" 3d quality	₱ lb 9½c
Sheet Cast Steel, 1st quality	₱ lb 17¾c
" " 2d quality	₱ lb 14½c
" " 3d quality	₱ lb 12½c
File Steel, Flat and ½ Round	₱ lb 12½c
" Square and Round	₱ lb 12½c
" Mill	₱ lb 13½c
" Taper to 4 inch	₱ lb 16c
" Taper 3 and 3½ inch	₱ lb 18c

ANTIMONY..... 13c currency

LEAD.—DUTY: Pig $2 ₱ 100 lbs; old Lead, 1½c ₱ lb; Pipe and Sheet, 2¾c ₱ lb.

Spanish	6⅛ @ 6¼c gold
German Refined	6¼c gold
English	6¾ @ 7c gold
American	5¾ @ 5⅝c
Bar	7c, dis 10 %
Pipe	7½c, dis 10 %
Tin Lined Pipe	15c, dis 10 %
Sheet	8c, dis 10 %
Shot	Drop 8¾; Buck, 9¾c, dis 10 %

BABBITT METAL.
N. P. U..... ₱ lb 8½ @ 9c
A 25c; B, 20c; C, 15c; D, 12c ₱ lb.

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₱ lb; Elecro-galvanized Plates, 2c ₱ lb; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent.

Banca	₱ lb 19 @ 19½ currency
Straits	₱ lb 17 @ 17⅛ currency
English	₱ lb 17⅜ currency

TIN PLATES, CURRENCY PRICES

I C 10x14 } I C 12x12 } I C 14x20 }	Prime Charcoal	$7.25 @ 7.50
I X 10x14 } I X 12x12 } 40x20 }	Prime Charcoal	9.50 @ 9.75
D C 12½x17	"	6.75 @ 7.00
D X 12½x17	"	9.00 @ 9.25
For each additional X add		2.25

COKE TIN PLATE.

	Best.	2d quality.	Ordinary.
I C 10x14 } I C 12x12 } I C 14x20 }	$6.75	6.50	6.00 @ 6.25

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$6.50 @ 6.62½	6.00 @ 6.37½	6.25 @ 6.00
I X 14x20	9.00 @ 8.75	....	....
I C 20x28	13.50 @ 14.00	13.00 @ 13.50	12.00 @ 13.00
I X 20x28	.... @ 18.50	....	....
I C 20x20	.... @ 21.00	....	....

I C 14x20 M. F. Brand..... $7.50 @ 7.75

SOLDER..... No. 1, 11½ @ 12½c; No. 2, 10¾ @ 11¼c

SPELTER—DUTY: in Pigs, Bars and Plates, $1 ₱ 100 lbs.

Silesian, cash	6¾ @ 7c gold
American, cash	6¼ @ 6½c
Lehigh, on spot	10c

ZINC.—DUTY: Pig or Block, $1.50 ₱ 100 lbs. Sheet, 2¾c ₱ lb.
Sheet..... cask 7¾c; " 8c

Paper Stock, Old Metals, &c

(*Dealer's Selling Price.*)

Canvas linen	5¾ @
" cotton, No. 1	@ 6¼
" " No. 2	@ 3½
White linen rags, No. 1	5½ @
" " No. 2	3½ @
Colored	2¼ @
Mixed woolens	2½ @ 3¼
Soft woolens	7 @
Gunny bagging	3¾ @
Jute Butts	3 @ 3½
Kentucky bagging	5 @
Waste paper and scraps	1 @ 1½
Rope cuttings	1½ @ 3
Kentucky bale rope	4 @ 4½
Oakum junk, No. 1	5½ @ 5¾
" No. 2	@ 4
Grass rope	3¾ @
Tarred shaking	2 @
White collar cuttings, all paper	7 @
" " muslin lined	5 @
" " Envelope	7 @
Hard White Shavings, No. 1	5½ @
Soft " " No. 1	4½ @ 4¾
White Shavings, No. 2	4½ @ 4¾
Mixed Shavings, part white	3½ @ 4
Imperfections, No. 2, best folded sheets	4¼ @
" No. 1, Heavy Stock	4¼ @
Book Stock	3½ @ 3¾
" " Mixed	4¼ @
" " No. 2, light	2 @
Newspaper Stock	2¾ @
Prints	1½ @ 2
Pure Manilas	2¾ @ 2⅞
Bogus Manilas and Hardwares	1 @
Commons	⅛ @
Binders' Board Cuttings	1 @
Straw Board Cuttings	⅝ @
Woolen Tailor Clips	13 @ 14
Satinet "	2 @ 2½

Old Metal.

Copper	15 @ 16
Yellow Metal	13 @
Brass, light	9 @
" heavy	10½ @
Heavy Composition	13 @
Old Lead, solid	@ 4½
Tea Lead	@ 4¾
Zinc	@ 4¼
Pewter, No. 1	13 @
" No. 2	8 @ 9
Spelter	@ 6½
Wrought Iron	per ton $19.00
Machinery Iron	per ton 13.00
Light Iron	per ton 13.00
Stove Plate	per ton 10.50
Burnt Iron	per ton 5.00

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₱ lb 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	25c
Black Paint, in oil	kegs, 8c; asst'd cans, 11c
Blue, Prussian, fair to best	40 @ 55c
" " " in oil	25 @ 35c
" Chinese dry	8c
" Ultramarine	18 @ 30c
Brown, Spanish	1¼c
" Van Dyke	9c
Carmine, 40	combination price
Green, Chrome	15 @ 23c
" " in oil	18 @ 26c
" Paris	good, 30c; best, 40c
" " in oil	30c; " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14c
Red Lead, American	8½c
" English	10½c
" Venetian (N. C.) dry	2c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Indian dry	10c
Rose Pink	10 @ 13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 20c
" Raw	15 @ 25c
Umber, Burnt	4 @ 8c
" in oil	16 @ 21c
" Raw	3½ @ 7½c
" in oil	16 @ 22c
Vermillion, Chinese	$1.00, gold
" English	72½c, gold
" Trieste	1.10, gold
" American, Common	18c
White Lead, American, pure dry	9½c
" " in oil	10c
White, Paris, English, prime	in bbls. 2½ @ 2¾c
Yellow Ochre, French	$1.75
" " in oil	asst'd cans, 11c; kegs, 8c
" " Vermont	in casks 1½c
Yellow Chrome	17 @ 27c
" " in oil	18 @ 28c
Zinc White, American No. 1, dry	9c
" " No. 1, in oil	11
" " French (Paris)	11
" " in oil	12

Oils.

Linseed, Raw	₱ gal. casks, 59c bbl, 60c
" Boiled	casks, 64c. bbl, 66c
Whale, Crude	bbl, —
" Bleached Winter	bbl, 75c
Sperm, Crude	bbl, 1.55
" Winter unbleached	bbl, 1.60
" " bleached	bbl, 1.75
Seal, Extra Refined	bbl, —
Lard, Pure Winter	bbl, 80c
" Spring	bbl, 80c
Cotton Seed, Crude	bbl, 62c
" Southern Yellow	bbl, 67c
" White	bbl, —
Neatsfoot, Winter	70c @ $1.10
Natural Lubricating	38c @ 40c

Sundries.

Asphaltum	9c
Benzine	₱ gal. 16c
Chalk	½c
" Block	¾c
Dryer, Patent, Am'n	asst'd cans, 10½c; kegs, 9c
" " English	" 11c; " 9c
Flocks	
Frostings	50c
Glue, White	33 @ 44c
" Sheet	20c
Glaziers' Points, Zinc	9c
Gum, Copal	35c
" Damar	25c
" Shellac, English	45c
" " dark	40c
Litharge	9½c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	2½c
Putty, in bladders	2½c
" in bulk	2½c
Rotten Stone, soft, English	8c
Spirits Turpentine	36c
Whiting, Spanish	½c

Glass.

FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

Single Thick.—discount 60 %

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 7.50	$ 6.75	$ 6.25	$ 5.75
11 x 14 to 16 x 24	8.50	7.75	7.25	6.50
13 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	
26 x 28 to 24 x 36	13.00	11.50	9.75	
26 x 37 to 26 x 44	14.50	13.25	10.75	
26 x 46 to 30 x 54	15.00	14.00	11.25	
30 x 52 to 30 x 54	16.00	14.50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	

Double Thick.—Discount 60&10 %

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$12.00	$11.00	$10.00	$ 9.25
11 x 14 to 16 x 24	13.75	12.50	11.75	10.50
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 54	24.00	22.50	18.00	
30 x 52 to 30 x 54	26.75

Steel.

SULZBACHER, HYMAN, WOLFF & CO.,

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WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
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Sheet Cast Steel Shear, German, Round Machinery, Hammer, Fork and Shovel Steel

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"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;

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"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

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Manufacturers of Every Kind of Steel Wire.

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Warranted most SUPERIOR and UNSURPASSED for

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MACHINERY STEEL.	KNIFE BACK STEEL.	" HARROW TEETH.
SPRING STEEL.	STEEL CROW BARS.	" TOE CALKS.

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Also, Springs, Axles, Rake Teeth, &c.

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Post Office Address, Pittsburgh, Pa,

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Works and Office, NICETOWN, PHILADELPHIA, PA.

MANUFACTURERS OF

CRUCIBLE AND OPEN HEARTH STEEL,

Steel Locomotive and Car Wheel Tires. Steel Axles of every description.

STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.

Solid Steel Castings, Hammer Dies, Frogs, Crossings, etc.

BEST TOOL, MACHINERY AND SPRING STEELS.

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Crystallized Black and Gray Oxides of

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R. MUSHET'S Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least **double work** by increased speed and feed, **and cuts harder metals** than any other Steel. Neither hardening nor tempering required.

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SAMUEL OSBORN & CO.,

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DUPONT'S

Sporting, Shipping, and Mining

POWDER.

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ESTABLISHED IN 1801,

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Celebrated Eagle Ducking, Eagle Rifle, & Diamod Grain Powder.

THE MOST POPULAR POWDER IN USE.

Also, SPORTING, MINING, SHIPPING, AND BLASTING POWDER.

of all kinds and descriptions.

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70 Wall Street, NEW YORK.

GUN POWDER.

Laflin & Rand Powder Co.

No. 26 Murray Street, New York,

Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

ORANGE LIGHTNING,
ORANGE DUCKING,
ORANGE RIFLE,

more popular than any Powder now in use.

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Wholesale Manufacturer of

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FISHER'S PATENT Mowing Machine Knife GRINDER. Send for Circular.

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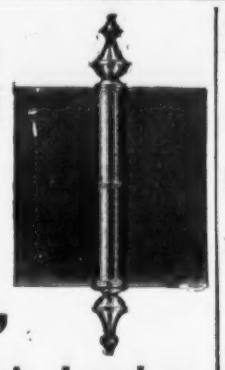

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Single or Double Handle, Reversible Mortise Latch,

Patented January 9, 1877.

Oilable Axle Pulleys,

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KEY ESCUTCHEONS that keep the Key in the Lock,

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And a large line of

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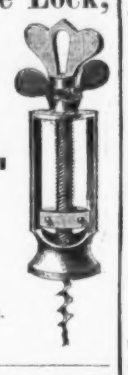

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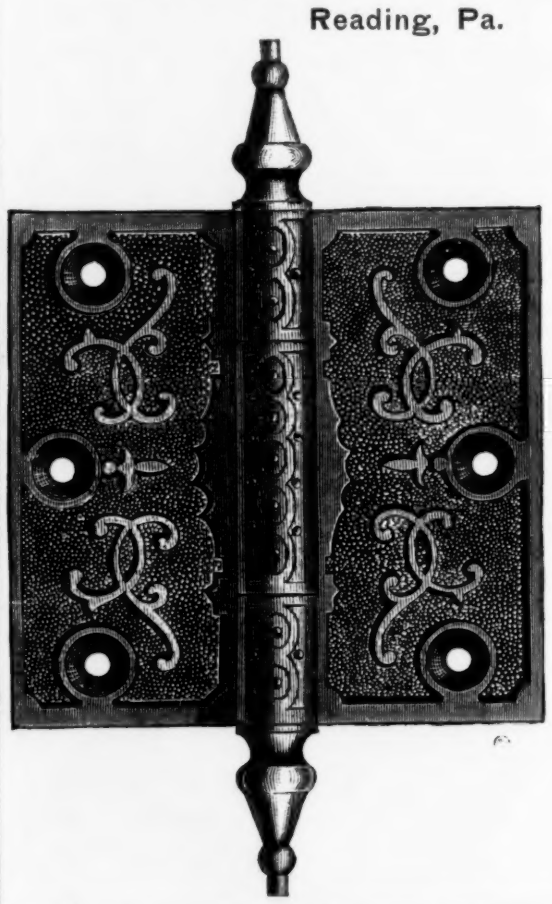

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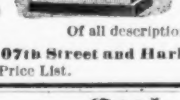
OIL 

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Are the most SECURE and DURABLE ever made.

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Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the Lock from being opened unless brought to proper position by the Key.

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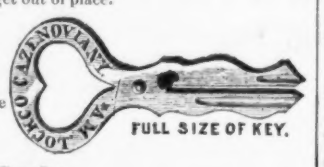
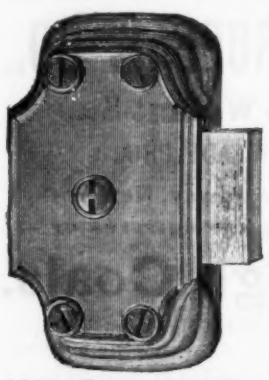
Because we use no Springs to break or get out of place.

THEY HAVE STERLING METAL KEYS That will not corrode or wear, and are stronger than steel.



FULL SIZE OF KEY.



Upright Rim Dead Locks,
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Mortise Night Latches, Plain Fronts,
Mortise Night Latches, Ornamental Bronze Fronts and Knobs,
Brass Chest, Box, Cupboard and Drawer Locks,
Solid Bronze Padlocks.

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LIGHTNING HAY KNIVES,

WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marches.

The blade is best cast steel, spring temper, easily sharpened, and is giving *universal* satisfaction. A few moments trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and *seems destined* to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 lbs. weights, suitable for shipping by land or water to any part of the world.

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Hiram Holt & Co.,

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For sale by the Hardware Trade generally.

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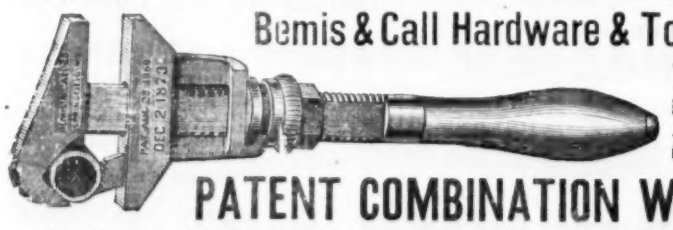
of all kinds, Made of Iron, Steel, Zinc, and Copper, of any Size or shape.

Manufactured by

BRIGHAM, LITCHFIELD & VINING, South Abington, Mass.

Bemis & Call Hardware & Tool Co.



This Wrench can be furnished with Bragg's Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

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THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar WIDE*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

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NEW PATENT

FERRULE

Which cannot be forced back into the handle.

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Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

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THE BEST ADJUSTABLE HOLLOW AUGER MADE.

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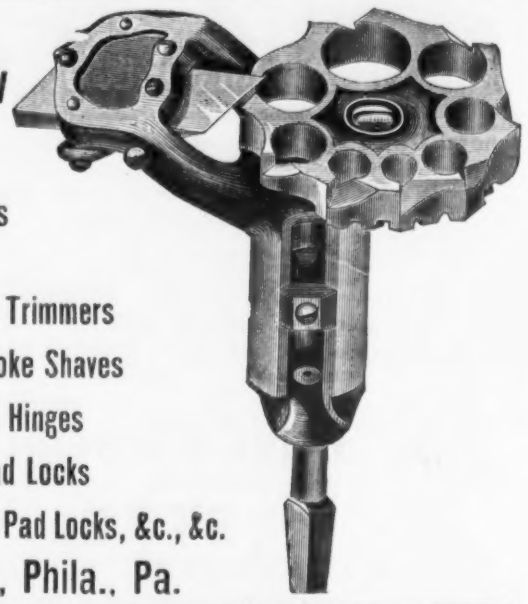

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Double Edge Spoke Shaves

Adjustable Gate Hinges

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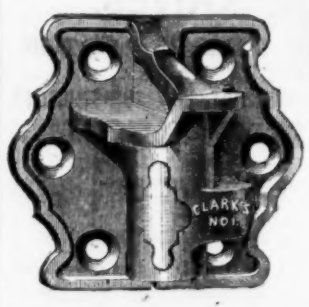

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Send for Catalogue and Price List.

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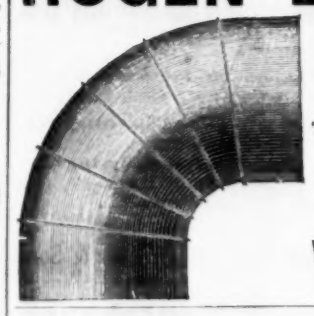

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This Elbow has no crimps, cavities or angles, which cause accumulations that rust or corrode the iron, and it is also easily polished and kept clean.

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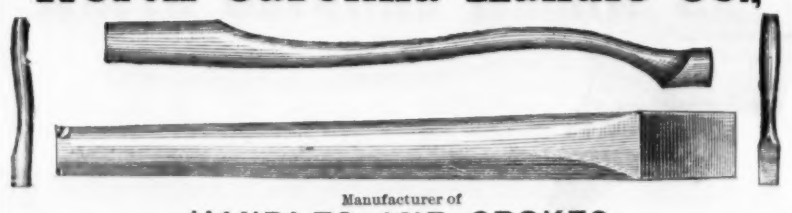

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Bells.—
Bevin Bros. Mfg Co. Light Hand Bells.....dis 70 @ 75%
Swiss Pattern Hand Bells.....dis 50 @ 50&10%
Connell's Door Bells.....dis 50 @ 50&10%
Gt. Western & Kentucky Cow, new list.....dis 50%

Boring Machines.—
Upright, with augers, $5 00; without augers..$3 00 net
Angular, " 6 00; " 4 00 net

Bolts.—Eastern Carriage Bolts.....dis 75&37½—cash
Philadelphia " " .....dis 60&10 @ 60&20%
Stanley, Wrought Shutter.....dis 50&10 @ 60%

Braces.—Barber's.....dis 40&5%
Packus.....dis 50 @ 50&10%
Spofford.....dis 50%
American Ball.....dis 25&10%

Butts.—Cast Fast Joint, Narrow.....dis 50&10%
" " " Broad.....dis 60&10%
Cast Loose Joint.....dis 65&10%
" Acorn, Loose Pin.....dis 65&10%
" Acorn " Jap'd.....dis 67½&10%
" Mayer's .....dis 60&10%
" Parliament.....dis 60&10%
Wrought Loose Pin.....dis 40&10%
" Table Hinges and Back Flaps.....dis 45&10%
" Narrow.....dis 40&10%
" Loose Joint.....dis 40&10%

Blind Butts.
Parker.....dis 60 @ 60&10%
Clark.....dis 60%
Shepard.....dis 60%
Lull & Porter.....dis 65 @ 65&10%
Huffer's.....dis 40%

Chains.—German Halter and Coil.....dis 30&5% gold
Galvanized Pump.....₱ lb 10½c net
Best Proof Coil Chain—(English).

₱ lb.....	11¼	5/16	7/16	½	9/16	⅝	¾ in.
	8½	¾	5/16	⅜	7/16	½	⅝ in.
	7¾	⅞	⅜	7/16	½	9/16	⅝ in.
	7½	⅞	⅜	7/16	½	9/16	⅝ in.
	8½	⅞	⅜	7/16	½	9/16	⅝ in.
	8¼	⅞	⅜	7/16	½	9/16	⅝ in.

7c gold

Chisels.—Socket Framing.....dis 65, 5&10%
Socket Firmer.....dis 65, 5&10%
Butcher's.....$5 00 to £ gold

Casters.—Bed.....dis 50&10%
Plate.....dis 50&10%

Coffee Mills.—Box and Side.....dis 25%
Enterprise.....dis 20%

Cutlery.—Walden Pocket.....dis 30 @ 35%
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net

Drawing Knives.—
Hart Mfg. Co.'s.....dis 65, 5&10%
Adjustable Handle.....dis 20%

Fry Pans.
Tinned.....dis 50&10 @ 60%

₱ doz..	$3 50	4 00	4 50	5 00	5 50	6 50	7 50	9 00	10 00
No....	0	1	2	3	4	5	6	7	8

Burnished.....dis 50&10 @ 60%

₱ doz..	$3 00	3 75	4 25	4 75	5 25	6 00	7 00	8 00	9 00
No....	0	1	2	3	4	5	6	7	8

Files.
Nicholson.....new list, dis 30%
" .....dis 30%
Disston.....$1 50 @ $1 75 £ gold
Butcher.....4 50 @ 4 75 £ gold
Spencer.....

Fluting Machines.
Imperial—4¼ in. roll.....each $2 50 net
" —6 in. roll....." 3 00 net
Crown—4¼ in. roll.....each 2 50 net
" —6 in. roll....." 3 00 net
" —8 in. roll....." 4 25 net
Eagle—3¼ in. roll.....per doz. $18 00 net
" —5¼ in. roll.....per doz. 24 00 net
Geneva Fluter.....per doz. 15 00 net
Favorite com. Fluter & Sad-iron..₱ doz $15 00 dis 15%

Hammers.
Yerkes & Plumb's.....dis 25 @ 30%
Hammond & Son's.....dis 25 @ 30%

Hatchets.
Yerkes & Plumb.....dis 25 @ 30%
Hammond.....dis 25 @ 30%
Hunt.....dis 25%

Hinges.
Strap and T.....dis 60 @ 60&5%

Horse Nails.

	Nos.	5	6	7	8	9	10
Ausable		30	27	25	24	23	22
" Pt'd & Polished		31	28	26	25	24	23
Globe		31	28	26	25	24	23
Clinton Horse Nails		20	18	17	16	15	
" Polished and Pointed		21	19	18	17	16	

Southern, all sizes.....₱ lb 14c. net
Discount on Ausable & Globe, 20%; Clinton, 15%

Locks and Knobs.
Branford.....new list, dis 6%&10&2% cash
Gaylord Cabinet.....dis 25&2% cash
United States Lock Co.....dis 35%
American Padlocks.....dis 33⅓, 5&2% cash
Scandinavian Pad Locks.

₱ doz...	$7 50	9 00	10 50	12 00	15 00	18 00	22 00	} 60&10%
No.....	57	58	59	60	61	62	63	
₱ doz.				$27 00		35 00	40 00	} 60%
No.				64		65	66	

Lanterns.—
Square Candle and Oil.....₱ doz. $2 75 @ 3 00
Tubular.....No. 0, $10 50; No. 1, 12 50 ₱ doz. net
Guards, 50 cents extra per doz., net.

Mattocks.—
Long and Short Cutter.....₱ doz. $9 00 @ 9 50 net
Pennsylvania Pattern.....9 50 @ 10 00 net

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20%
Stebbins' Gates.....dis 62½&10%
Lincoln's " .....dis 62½&10%
Landers, Frary & Clark's Petroleum.....dis 20&10%
Brass Liquor Cocks.....dis 50%
Cork Lined " .....dis 65 @ 65&10%

Meat Cutters.—Dixon's.....dis 25 @ 30%
Woodruff.....dis 25 @ 30%
Stowe.....dis 25 @ 30%
Hale's.....new list, dis 50&2%
American.....dis 25%
Stuffers.....dis 25 @ 30%
Enterprise Stuffers.....dis 30%

Planes.—Sandusky.....dis 40%
Ogonts.....dis 50&10%
Bailey.....dis 25&10%

Plane Irons.—Sandusky.....dis 10%
Butcher's.....gold £, $5 00

Plumbs and Levels.
Stanley's Adjustable.....dis 60&10%
" Non-Adjustable.....dis 60&10%

Picks.—Philadelphia.....dis 20%
Hunt's.....dis 25%

Rules—Stanley Boxwood.....dis 50&10%
Stanley Ivory.....dis 40&10%

Steelyards.—Hart's Pattern.....dis 60&10%

₱ doz.....	$14 50	15 75	21 00	26 50	31 50	35 50
Lbs.....	50	100	150	300	250	300

American Pattern.....dis 25 @ 25&10%

₱ doz.....	$5 50	7 00	9 00	10 00	11 00	12 00
Lbs.....	50	100	150	200	250	300

English Pattern.....dis 25 @ 25%

₱ doz.....	$7 00	8 67	10 67	12 67	14 67	16 67
Lbs.....	50	100	150	200	250	300

Squares.—
Steel and Iron.....dis 70%; full case, dis 50&10%
Try Squares, Stanley.....dis 45&10%
Disston's Try Squares.....dis 45%

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₱ doz. $9 00 net
Clipper No. 10, Bronzed Blade Boxed and Sharpened.....₱ doz. $8 50 net
Clipper No. 5, Painted Red, Boxed and Sharpened.....₱ doz $8 25 net

Saws.—Disston's Hand, Panel and Rip.....dis 20%
Disston's Circular.....dis 30%
" Cross-Cut No. 2, Plain Tooth..₱ ft., 45c. net
" " Patent Tooth.....₱ ft., 45c. net
" " Champion Tooth....₱ ft., 35c. net

Shovels and Spades.
Rowland.....dis 50&5%
Oliver Ames & Sons, new list.....dis 30%

Sad Irons.—4 to 10 lbs.....₱ lb., 2¼ @ 2¾c
Mrs. Potts' Patent.....dis 30 @ 40%

Stone.—Arkansas Oil Stone.....₱ lb $1 25 net
Washita Extra....." 25c net
" No. 1....." 20c net
" " 2....." 25c net
" Slips....." 60c net
" Axe....." 25c net
Turkey Oil Stone No. 1....." 16½c net
" " " 2....." 16c net
" Axe Stone....." 25c net
Hindostan Oil Stone No. 1.....₱ lb 4 @ 4½c net
" Axe Stone....." 5 @ 5½c net

Screws.
United States and others in Combination....dis 60&10%

Spoons.—
Plated.....dis 40 @ 40&5%
German Silver.....dis 25%
Britannia, Boardmans.....dis 50&10%
" Parkers.....dis 50&10%
Tinned.....dis 10%
" by case.....dis 20%

Springs—Torrey.....₱ doz $2 00 @ 2 10 net
Philadelphia.....5 in., $5 00; 8 in., $7 00 ₱ doz. dis 25%
Chatfield.....No. 1, $3 50; 2, $4 00; 3, $5 00 ₱ doz. net
Gem Coil No. 1, Large Jap'd.....₱ doz $3 50)
" " No. 2, Medium Jap'd....." 2 50 } dis
" " No. 3, Small " ....." 2 00)

Stocks and Dies......dis 10&5%

Stove Polish.—Gem.....₱ gross, $4 25 @ 4 50 net
Dixon....." $5 75 @ 6 00 net
Onyx....." $4 00 @ 4 25 net

Tacks, Brads, &c.
Tacks, Half Weight American....dis 75&20%
" Full " .....dis 50&20%
" Half " Swedes.....dis 65&20%
" Full " .....dis 30&20%
" Carpet, Am. and Swedes..dis 20&20% } dis 10% cash
" Leather Head.....dis 20%
" Copper.....₱ lb 52c., dis 20%
Brads, Half Weight.....dis 50&20%
Shoe Nails—
4-8 and larger, 9c; 3-8, 9½c ₱ lb., dis 20&10%
Trunk, Clout and Finishing Nails—

⅝	½	7/16	⅜	1	1¼ and over
25.	30.	17.	13.	18.	11c ₱ lb., dis 20&10%

Double Pointed Tacks.....dis 40&5%

Traps.
Genuine Oneida—Newhouse.....dis 30%
Im. Oneida—Newhouse list (1st qual.).....dis 60%

Vises.—Solid Box, Trenton.....₱ lb 11½ @ 12½c net

Wrenches.—
Girard (Coe's Pattern).....dis 50&10%, case 50, 10&5%
Agricultural—
₱ doz 10 in., $3 60; 12 in., $5 40 net; case dis 5%
Coes' Genuine.....dis 50&5%
" Pat. Wrot Bar .....dis 60 @ 60&10%
" " Mall " .....dis 75%
Taft's " Wrot " .....dis 75%
Phila. Tool Co., Duplex.....dis 25%

Wire.—
Bright or Ann'd, No. 0 to 18.....dis 52½ @ 55%
" " No. 19 to 26.....dis 57½ @ 60%
" No. 27 to 36.....dis 60 @ 62½%
Coppered 0 to 18.....dis 47½ @ 50%
Tinned Broom Wire.....dis 42½ @ 45%
Galvanized, No. 7 to 18.....dis 22½ @ 25%

Wringers.—Novelty No. 10.....₱ doz. $63 00 net
Novelty No. 2....." 66 00 net
Universal, No. 2½....." 63 00
" No 2....." 66 00

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
Sept. 1, 1877.

Apple Parers—Bay State.....per doz $12 00
Faultless Turn Table....." 7 50
Lightning....." 7 50
Peach Parers....." 12 00
Potatoe Parers....." 12 00
Climax Corer and Slicer....." 6 00
Bells, Cow—Law & Genuine.....dis 50%
Braces—Bit, Spofford's Patent.....dis 50%
Brass—Sheets.....list net
Boards—Stove, Brooks' Pat..dis 40%, 4 mos.; 40&5%, 30 dys
Bolts—Stove.....dis 50%
Brick—Bath (box of 2 doz) Best English.....$1 15
Can Openers—Sprague's.....dis 55&10%
Cases—Parlor Coal Hod.....dis 25%
Chisels—Firmer Socket.....dis 60, 10&10%
Framing Socket.....dis 60, 10&10%
Corner Socket Chisels.....dis 60, 10&10%
Slick's Carpenters'.....dis 60, 10&10%
Castings—Malleable.....₱ lb 7½c
Cocks—Globe and Bibb.....dis 45%
Cutters—Meat, "Hales".....50%
Egg Beaters—"Dover".....per doz $4 00
" Family ".....per doz $2 75
Elbows—Corrugated.....dis 30%
Adjustable.....dis 30%
Columbus.....dis 25%
Files—Maischoss Bros.....dis 50&10%
Fluters—Geneva Hand.....₱ doz. $15 00
Freezers, Ice Cream—"Champion".....dis 33⅓&5%
Hinges, Gate—Shepard's.....dis 45%
Hinges—Window Blind—
Shepard's and Standard.....dis 60%
Hose, Coal—Plain, Black and Galvan'd...new list dis 25%
Funnel, Black and Galvanized.....dis 25%
Fancy and Helmet.....dis 25%
Sad Irons.....3c
Kettles—Brass.....₱ lb. 45c
Copper, "Hand Made".....36c.
Enameled.....dis 60%
Knives, Drawing—Oval No. 1.....dis 60, 10&10%
Razor Blade.....dis 60&10%
Lanterns, Tubular—with guard.....$10 50
Without guard.....10 00
Mills, Coffee—Box and Side, common.....dis 25%
Box Union and Eagle.....dis 30%
Cut Nails, "Chesapeake," 10d.....$2 50
Horse, Ausable.....No. 5 6 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished.....add 1c ₱ lb
" " 1000 lbs.....dis 20%
Paint—White Lead, U. S. Gov't.....₱ lb 8c
Pans—Dripping.....₱ lb 9c
Frying.....dis 50%
Rivets—Iron, Black and Tinned.....dis 40%
Screws—"American screw Co"—
Flat Head, Iron.....dis 60&10%
Flat Head, Brass.....dis 55%
Sieves—Wood, Hoop iron.....$1 20
Tinned.....1 50
Sifters—Ash.....$9 00 @ $12 00
Skates and Straps—White's.....dis 30%
Spoons, Iron Tinned.....dis 10%
" by the case.....dis 20%
S. S. & Co., Kitchen.....dis 35%
Plated Rogers' A No. 1.....dis 40&5%
Britannia.....dis 55%
G. S. Hall, Elton & Co.....dis 25&5%
Scales—Buffalo Scale Works.....dis 25%
Fairbanks.....dis 15%
Stove Polish—Gem.....₱ gross, $4 50
" Dixon's....." 6 00
Palace.....₱ gross, $3 00 bulk, per lb., 9c
Rising Sun.....₱ gross, $5 75
Squeezers—Lemon, Porcelain.....₱ doz., $5 40
Tacks—Half Weight Am. Iron.....dis 55&20%
Tea Trays.....dis 15%
Thermometers—Tin Case.....dis 50, 10&10%
Tools—Trimens'.....dis 10%
Vases—Palace Coal.....dis 25%
Vises—
Parallel, Buffalo.....dis 30%
Wire—Brass and Copper.....list net
Wire—Bessemer Steel.....dis 25%
Wringers—Novelty.....No. 2, $6 00; No. 10, $63 00
Tin Plates.—Add 10c each X.

10x14, IC, Charcoal	₱ box	$7 25	14x20 C. terne	₱ box	$6 75
12x12, "	"	7 25	30x28 C. "	"	14 50
12½x17, "	"	6 75	20x28 X. "	"	19 50
14x20, "	"	6 75			

Pig Tin—Straits.....20c @ 21c
Bar Tin.....22c
Solder—S. S. & Co. No. 1.....13c
S. S. & Co. Extra.....15c
Sheet Zinc—
"Lasalle".....570 ₱ casks
$8 00 $ 100 ₱ lbs
Sheets.....$8 00
Babbitt Metal.....₱ lb 12c
Iron Wire—Bright and Annealed.....dis 52½%
Coppered.....dis 47½%
Tinned.....dis 35%
Tinned Broom, Nos. 20 21 22
20c 21c 21c dis 40%
Copper—Sheathing 14 @ 18 oz.....₱ lb 28c
Planished.....₱ lb 36c
" Boiler Sizes.....₱ lb 38c
Bottoms.....₱ lb 30c
Bolts.....₱ lb 30 @ 32c
Brazers' Sheets.....₱ lb 30 @ 32c
Sheet Iron.

	A.	B.
18 Common	$3 05	
24 Common	3 25	
26 Common	3 45	
24 W. D. Wood & Co., Smooth Finish	4 25	
Planished	A.	B.
	11c	9½c
Gen. Russia, No. 1 stained	12c	
" " clean	12½c	
Galvanized	dis 35%	

Tin Ware.
Deep Stamped Plain and Retinned.....45%
Com. " " .....dis 35%
Japanned " " .....dis 35%

CHICAGO.

(The Chicago Stamping Co., 72, 74 & 76 Lake St.)
Sept. 19, 1877.

Tin Plate.—

10x14, IC, Ch'l. Good	$	14x20, IXX, Ch' Best	12 75
10x14, IC, " Best,	7 75	14x20, IXXX, " "	15 25
10x14 IX, " "	10 25	DC, 100 Plate " "	7 75
12x12, IC, " "	7 25	DX, " "	10 25
12x12, IX, " "	10 25	DXX, " "	12 75
14x20, IC, " "	7 75	DXXX, " "	15 25
14x20, IX, " "	10 25	IC, Roofing, " "	7 25
20x28, IC, Charcoal Roofing, Good		IX, " "	9 75
20x28, IC, " Best			14 50
20x28, IX, " "			15 00
10x14, IC, Coke Plates			19 50
14x20, IC, "			6 75
10x20, IC, "			7 25
			11 00

Block Tin.—
Large Pigs.....20c | Bars.....22c
Small.....21c
Zinc.—Sheet, 500 to 1000 lb. Casks.....7½c
Loose Sheets.....8 c
Slab Zinc or Spelter.....7 c
Copper.—Bottoms.....33c
Sheathing.....30c
Planished.....37c
" Boiler lengths.....39c
Bolt.....35c
Braziers' Sheets.—
30x60, 6 to 7 lbs....₱ lb 6c | 30x60, 10 to 12 lbs...₱ lb 32c
30x60, 8 to 9 lbs.....34c | 30x60, 15 to 100 lbs.....c
Solder.—F. S. & Co.'s make
Best Fine.....16c
No. 1.....15c
Roofing.....13c
Braziers or Spelter Solder.....35c
Antimony.....18c
Babbit Metal—F. S. & Co.'s.....16c
No. 2.....14c

Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24	3·20c	4·1c	5 c	8 c
25 & 26	3·40c	4·6c	6¼c	8¼c
27	3·60c	4·8c	6½c	8½c

Galvanized Iron.—

No. 16 to 20	12c	No. 27	15c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—
Perfect.....12½c | No. 1 Stained.....12½c
In Sheets, 1c. higher.

American Russia.—
A.....11c | B.....9½c
In sheets, 1c higher.

Lead.—
Pig.....7 c | Lead Pipe, in full coils 8¼
Bar.....7½ | Lead Pipe, when cut.. 9
Sheet Lead.....9

Wire—Bright.....dis 47½
Coppered.....dis 40%

PITTSBURGH.

The following are the Card rates, f. o. b. in Pittsburgh of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St. New York, Agent.
Merchant Bar Iron.....2c rates net
Flat Rail (1¼x¾), punched and coun'sunk..2¾c ₱ lb net
Iron Wedges.....3¼c ₱ lb net
Norway Nail Rods, Vass.....1 c ₱ lb net
Iron Crow Bars (in ordering please state whether "Wedge" or "Pinch" point)...4 c ₱ lb net
Beetle Rings.....5¼c ₱ lb net
Fence Pickets—
⅝ r'nd, bent to shape, 25c ₱ ft. of fence, less 15% off net
Discount off Standard List.
Carriage and Tire Bolts, $500 worth purchased in six months, ending July and Jan. 1....75, 5&5% off net
Stove Bolts.....40% off net
Elevator Bolts.....30% off net
Machine and Square Head Bolts.....60% off net
Coach and Lag Screws.....60% off net
Bolt Ends.....60% off net
Pat. Hot Pressed Sq. and Hex. Nuts.....75c ₱ lb off. net
Washers, all made from new band iron..75c ₱ lb off net
Nuts and Washers in 25 lb. boxes, ½c ₱ lb ex. Nuts and Washers in lots less than one keg each size, ½c ₱ lb ex. Nuts and Washers in 5 lb. boxes, 1c. ₱ lb ex.
Standard Caps, for Plows.....4½c. ₱ lb net
Iron Harrow Teeth, in lots of 1 ton or more, packed in 200 lb. boxes, 1 in. diam. 2¾c ₱ lb net; ⅞, ¾ in. diam. 2¾c ₱ lb net; ⅝ in. diam. 3c ₱ lb net.
Pat. Headed Harrow Teeth, packed in boxes, ½c ₱ lb ex.
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 4½c ₱ lb net; 9-16 in. diam. 5½c ₱ lb net; ½ in. diam. 6½c ₱ lb net. ½c ₱ lb extra when less than 1 keg of each size is ordered.
Screw Hook and-Eye Hinges, with Pat. Hooks, ⅝ to 1 in. diam., 7c ₱ lb net; ⅜ in. diam., 8c ₱ lb net; ⅛ in. diam., 10c ₱ lb net.
Screw and Strap Hinges—all sizes under 28 in. long have Pat. Hooks, 14 to 36 in. long, 3 4-10c ₱ lb net; 6, 8, 10 and 12 in. long, 4 9-10c ₱ lb net.
Strap & T Hinges.....60&10% off net
Hereafter we will not make any allowances for fright on Strap and T Hinges; our price on them is F. O. B. in Pittsburgh.
Screw Hitching Rings, light, with ¼ ring, No. 1, $4 00 ₱ 100 net: heavy, with 5-16 ring, No. 2, $4 50 ₱ 100 net.
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₱ lb 3½c net
1 to 2 in. diam. from 4 to 8 ft. long.....3½c net
1 to 2 in. diam. from 1½ to 4 ft. long.....3½c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long.....4 c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long 4½c net
Bridge bolts with upset ends.....¼c. ₱ lb extra
Wrought iron plates, punched.....3½c. ₱ lb net
Cast Iron Washers.....₱ lb 3½c net
Grass Rods.....7½c ₱ lb net
Heel Bolts.....8½c ₱ lb net
Duck Nest Tuyere Irons.....$13 50 ₱ doz net
Wrought Iron Repair Links.....15% off net
" " Rings.....50% off net
" " Lap Rings.....33⅓% off net

WAGON HARDWARE.

Single Trees, Neck Yokes and Double Trees, made from best selected Hickory, and ironed complete, in the most approved patterns.
No. 1 Southern Plow Single Tree, Ironed complete, Irons all Wrought.....each, 38c net
No. 2 Western Plow Single Tree, Ironed complete, Irons all Wrought.....each, 50c net
No. 3 Wagon Single Tree, Ironed complete, Irons all Wrought, except Malleable Ferrule.....each, 60c net
No. 4 Wagon Single Tree, Ironed complete, Irons all Wrought; Improved End Pieces riveted on; one side acts as a wear iron for wheel to rub against.....each, 60c net
Neck Yoke, Ironed complete, Irons all Wt., except End Ferrules, with Wt. Iron Rings.each, 70c net
Southern Plow Double Tree, Ironed complete, Irons all wrought.....each, 60c net
Wagon Box Strap Bolts—For Orders of 50 Set, 45% dis.

10 in. long by 7-16 at Screw End, ₱ set of 8 bolts..					45c
12	"	½	"	" 8 "	55c
10	"	9-16	"	" 8 "	65c
12	"	9-16	"	" 8 "	70c
14	"	9-16	"	" 8 "	80c
10	"	⅝	"	" 8 "	80c
12	"	⅝	"	" 8 "	80c
14	"	⅝	"	" 8 "	90c
16	"	⅝	"	" 8 "	1·00
18	"	⅝	"	" 8 "	1·10
20	"	⅝	"	" 8 "	1·20

5c ₱ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wrought Iron Bolster Plates, 2¾ in. wide, ₱ set.....45c
" " " 8 " " 50c
" " " 3¼ " " 55c
" " " 3½ " " 60c
Wrought Hammer Straps, heavy pattern, each.....13 c
" " " light " each.....12 c
" Rub Irons, each.....9 c
Double and Single Tree Clips, figure 1, each.....8 c
" " " " 2, each.....9 c
" " " " 3, each.....11 c
Pole Caps, each.....20c
Strap Bolts, Bolster Plates, Hammer Straps, Rub Irons Clips and Pole Caps, in lots of 50 sets.....dis 45%
For each order amounting to $20 net, or over, for the following goods: Wagon Hardware, Carriage and Tire Bolts, Rivets, Skein Bolts, Nuts, Washers, Chains, Bevel Box and Tongue Cap Iron, we will allow an extra discount of 10 per cent. off all Wagon Hardware, subject to discount, comprised in the order. Jobbers who do not deal in iron, we allow to substitute Strap and T Hinges in lieu of Bevel Box and Tongue Cap Iron to make order up to $20 worth and secure the extra discount of 10 per cent.
Single Tree Hooks, Nos. 1 and 2.....each, 3½c net
Single Tree Irons, New Pattern.....each, 4½c net
Stay Chain Hooks.....each, 3½c net
Wagon Box Rods, narrow track, with Pat. Collar.....each, 7½c net
Wagon Box Rods, wide track, with Patent Collar.....each, 8½c net
Wagon Brake Ratchets.....each, 7 c net
" " " finished with guard..each, 20c net
Single Tree Iron, Wt. Hook, Malleable Ferrule.....each, 7½ net
Single Tree Iron, Wt. ⅝ Hook and 7-16 Clip..each, 7c net
Single and Double Tree Iron, Wrought Center Clip, ⅝ in. Welded, with ½ in. Ring...each, 10c net
Southern Plow Center Clip, ⅝ in. Welded, and 7-16 End Clip with 5-16 in. Hook—per set of 3 pieces, 20c net
Neck Yoke End Ferrule, Malleable, with Wt. Iron Ring.....each, 6½c net
Neck Yoke Attachment, with plates complete.....each, 23c net
Axle Tree Clips, No. 1.....each 2¾c net
" " No. 2.....3¼c net
" " For Farm and Lumber Wagons, Shank, 9-16 in., flat part 1¾ in.....each, 6¾c net
Plow and Wagon Clevises.....₱ lb 7c net
California Tire Rivets and Burrs, 5-16.....10c net
" " " ¼.....11c net
Wagon Box Staples, 1¼ to 2¾ in. to clinch. ₱ 1000 $10 75 net
" " Bevel Box Iron, to rivet on, ₱ 1000 7 25 net
Neck Yoke Eyes, each.....4¼c net
" " with ⅝ rings, each.....7c net
King Bolts, ⅝, 1, 1⅛, and 1¼ in. diam.....₱ lb 3½ net
Wagon Rivets, ex. large flat, oval and steeple head, ⅛ in. diam., 1 in. and longer.....7 c net
Wagon Rivets, 3-16 in. diam., 1 in. and longer 8 c net
" ¼ to 1 inch long.....₱ lb 1c extra
" & Nails, in 5 lb paper boxes.... 1c extra
" " in 25 lb wood .... ½c extra
Wagon and Hinge Nails, pointed by hand—
⅛x3 and longer. 2¼ & 2½ 2 & 2¼ 1¾ and shorter.
11c ₱ lb.. 13c ₱ lb. 15c ₱ lb. 17c ₱ lb net
3-16x3 and longer. 2¼ & 2½ 2 & 2¼ 1¾ and shorter.
12c ₱ lb. 14c ₱ lb. 16c ₱ lb. 18c ₱ lb net
Wagon Rivets and Nails, in less lots than one keg each size.....₱ lb ½c extra
Double Tree Plates.....7¼c net
Coupling " .....4½c net
Tongue " .....7½c net
Neck Yoke Plates.....8¼c net
Tongue Cap Iron, 1¼, 2 & 2¼ in. wide, same price ₱ lb as No. 12 Band Iron.
Sand Band Iron, 1¼ in. wide, same price as No. 12 Band Iron.
Hub Band Iron, ½c ₱ lb over price of same size Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in., ₱ lb 7c net; ¼ in., 8c net.
Our prices are all subject to change of market, without notice.

Guy C. Hotchkiss, Field & Co.

85 First St., Brooklyn, E. D., and New York City,

WILL SELL

SPRINGS

Lower than anyone else.

Send for prices and give estimate of quantity you will be likely to buy during six months or a year, upon which we will base quotation.

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CARRIAGE MATERIALS, AXLES, SPRINGS

Blacksmiths' Supplies,

BOLTS, WOOD WORK, TRIMMINGS, &c.

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FOR MELTING ALL KINDS OF METALS,

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Sunny Side Stove Polish.

Lumber Pencils, Foundry Facings and Lubricating Plumbago.

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410 & 412. NORTH THIRD ST. PHILA.

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LEATHER BELTING.

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All Belts warranted. Orders by Post immediately attended to.

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Best quality. Lowest prices.

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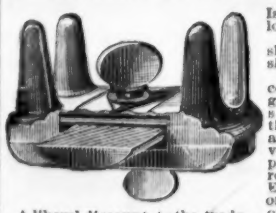
Agent NATIONAL RUBBER CO. *Philadelphia, Pa.*

American Skate Sharpener



Is just what has long been wanted. Every skater sharpens his own skates.

It does the work complete on both groove and flat skates, without the aid of a vise, and is carried conveniently in the pocket. It sells readily at sight. Every skater buys one.

A liberal discount to the trade. Sample and price list sent by mail on receipt of 50 cents.

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Selin's Grove, Pa.,

Sole Manufacturers and Proprietors.

JOHNSON'S PATENT UNIVERSAL LATHE CHUCK.

We invite attention to the superior construction of this chuck. Its working parts are *absolutely protected from dirt and chips.* It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address.

Lambertville Iron Works, Lambertville, N. J.

PATENTED ST. LOUIS STAMPING CO., ST. LOUIS, MO. MAY 30, 1876.

GRANITE IRON WARE

All Goods Marked FOR SALE Granite Iron Ware, EVERYWHERE

GRANITE IRON WARE IS THE ONLY SUITABLE HOUSEHOLD WARE MADE.

Represented in New York by the WIEBUSCH & HILGER HARDWARE CO., Nos. 84 and 86 Chambers Street.

CENTENNIAL EXHIBITION PRIZE MEDAL AWARDED.

☞ WARRANTED. ☜

The Double Screw Parallel "Leg" Vise

Stronger than any other, whether of Foreign or of American make; always parallel and holding with a tighter "grip." The jaws are of convenient shape for the workman to get near his work equally well for filing or chipping, instead of the heavy, clumsily formed jaws of the cast iron Single Screw Vises of the common "parallel" type.

Our Vise combines all the advantages of the "Peter Wright" Leg Vise, of strength and lightness, fastening to the floor and bench, and a the same time greatly superior to it: is always perfectly parallel at a points of opening, and never gets out of line. *We now warrant these Vises for three years from date of manufacture* stamped upon each.

The Jaws are of best Tool Cast Steel, welded on, file cut and properly hardened. The screws are forged of the best refined iron, and work in *solid cut thread* boxes. The lower screw maintains the parallel position of the two jaws, by having exact motion with the upper working screw through the connecting chain which regulates it. The chain has no strain of the work upon it, and is therefore as durable as all the other parts.

REDUCED PRICE LIST.

No. 1, Jaws 3½ in. x ¾ in., Screws ⅝ in. diameter, Lever 9 in. long, opens 4½ in. $7 00
No. 2, Jaws 4½ in. x 1 in., Screws 1⅛ in. diameter, Lever 13 in. long, opens 5½ in. 11 00
No. 3, Jaws 5½ in. x 1⅜ in., Screws 1⅜ in. diameter, Lever 16 in. long, opens 6½ in. 16 00
No. 4, Jaws 6½ in. x 1¾ in., Screws 1¾ in. diameter, Lever 19 in. long, opens 7⅞ in. 20 00
No. 5, Jaws 7 in. x 1⅝ in., Screws 1⅝ in. diameter, Lever 24 in. long opens 9 in. 27 00
No. 6, Jaws 8 in. x 1¾ in., Screws 1¾ in. diameter, Lever 26 in. long, opens 10 in 30 00

All sizes of these Vises furnished with Swivel Attachment at same price.

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade.)

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MAKER AND PATENTEE OF

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ROLLER TUBE EXPANDERS

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Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order.

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I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

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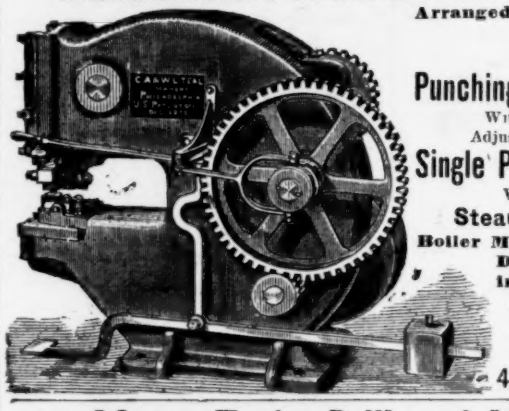
Manufacturers of IMPROVED BENDING ROLLS



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Punching & Shearing Machines,

With "Automatic Stop motion," Adjustable to any point of the stroke.

Single Power Punching Machines,

With Shearing Attachments.

Steam Riveting Machines,

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MACHINERY

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NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

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Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

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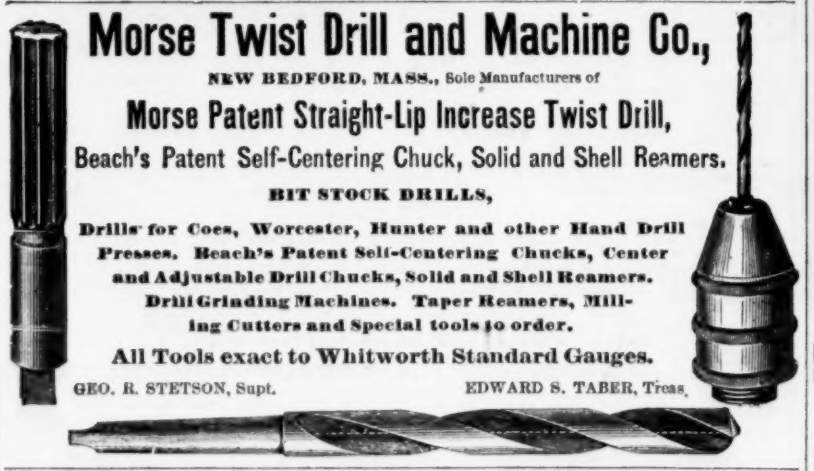

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RIVAL STEAM PUMPS

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CLIPPER Vertical Engines, off and on wheels! Price on wheels, 6 horse-power, $485; 8 horse on wheels, price, $700. **Dry Steam** Horizontal Engines, 8 horse power Climax, on wheels, $925. Builders of Stationary Engines, 4 styles, from 6 to 200 horse power. Corliss Engines, Extra Finish and Cut-Off Engines, Crank, Stationary and Plain Finished Engines. Boilers, Circular Saw Mills, &c. Successors to Utica Steam Engine Co., formerly Wood & Mann. Established 1857. We have the *largest* line of Engine Patterns in the United States.

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MALLETS,

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COTTON AND BALE HOOKS,

Patented Feb. 13, 1877; a new combination of Hooks.

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OLIVER'S CHILLED PLOWS.

160,000
Plows now in use,
GIVING
Perfect Satisfaction.

OVER
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INVESTED
In Their Manufacture.

With new jointer and colter. The only perfect Plows. Every farmer should try them, and every dealer should know what they are. Do not waste money on poor tools. Get the genuine OLIVER. Look for the name on the beam. BEWARE OF INFRINGING IMITATIONS.
Manufactured only by

SOUTH BEND IRON WORKS, South Bend, Ind.

Branches at **Mansfield, Ohio; Indianapolis, Ind.; Dallas, Tex.**

CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other
Two sizes: Large Size Boring, ⅞ to 3 inches; Small Size Boring, ½ to 1¼ inches.

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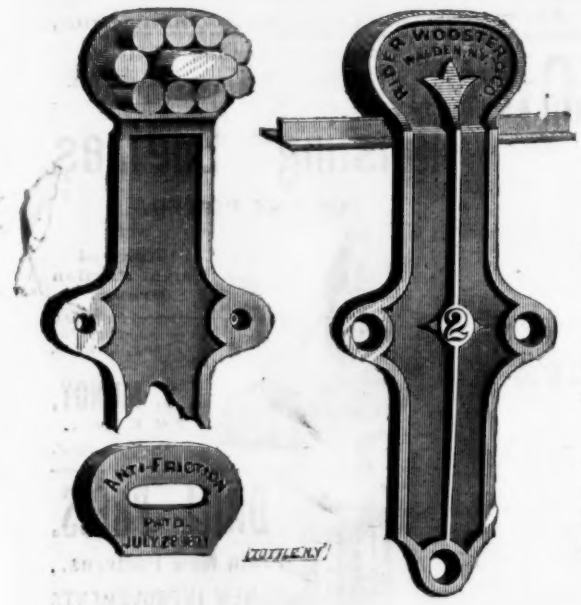
THE ANTI-FRICTION
BARN DOOR HANGER.



This well-known and popular Hanger is in too general use to require any description.

It is the

Original & Only Anti-Friction Hanger

in the market.

Guaranteed to run twice as easily as any other style.

It is the ONLY ONE made without a Sheave or Wheel, and that will not mount the rail or run off the track.

Only two sizes made.

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Western File Co.'s Files of all descriptions,
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Philadelphia Carriage and Tire Bolts,
Plymouth Mills' Black and Tinned Iron Rivets,
Frances' Shutter Holders,
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Logan and Strobridge's Brighton Coffee Mills, &c.,
Anthony & Cushman's Tacks, Brads, &c.

Depot for the Gaylord Mfg. Co.'s Cabinet Locks.

In addition to the above, we offer a large line of

AMERICAN HARDWARE.

Towne's Pat. Liquid Bronze, in all Colors & Shades.

Patented 1870, 1872 and 1874; Improved 1875 and 1877. **ARTHUR TOWNE, Patentee.**

For Bronzing all goods, whether of metal, plaster or wood, viz: Picture frames, ornaments, steam and gas fixtures—in fact, iron goods and wares of every description. Is easily applied by anyone. For striping it has no equal. The Post Office and Custom House in Boston and New York Custom House were decorated with this liquid. For yacht and vessel bottoms it has no equal, having been used by the Boston Yacht Club the past four seasons, beside many others too numerous to mention.

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Send $1 for Sample Tube of Liquid Bronze paid through. State color wanted.

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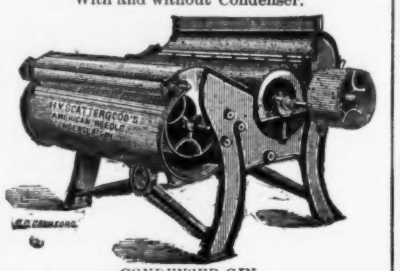
With and without Condenser.



CONDENSER GIN.

The cheapest and best in the market. Fire Proof. Can gin in the open air. Cleans the cotton perfectly.

Grand Centennial Medal Awarded this Gin.

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THE "DUCKHAM" PATENT
Suspended Self-Indicating
WEIGHING MACHINE.

Capacities from 1 to 100 tons.

This machine is used on a crane or any lifting apparatus, and indicates the weight on the dial directly the article is lifted. It is accurate, requires no adjusting, portable, and the greatest labor-saving weigher ever introduced.

Send for Circular and Price List.

Robert King & Son.

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Hydraulic Presses, Accumulators, &c.

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Fairmount Machine Works,
OFFICE, 2106 WOOD ST., PHILADELPHIA.
Manufacturers and Specialties
THOMAS WOOD,
POWER LOOMS,
Beaming, Spooling, Dressing and Slashing Machines, Reeling, Winding Machines, Wind direct from the Bank to Self-acting Wool-Spooling Machines, Card and Paraffine Oil Feeders,
SHAFTING
With Patent Self-Oiling Hangers,
Pulleys from 4 inch to 10 feet in diameter,
Pulleys in two parts,
Power Hoisting Machines,
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PIONEER IRON WORKS,

Nos. 149 to 163 William Street,
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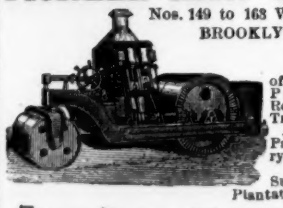

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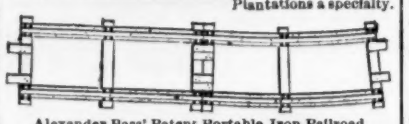
All kinds of Paving Machinery.

Machinery for Sugar Houses and Plantations a specialty.



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All Styles and Sizes.

Made (and patents owned) by

THE

MOHAWK & HUDSON MFG CO.,

WATERFORD, N. Y.

BOSTON.

Reported by Macomber, Bigelow & Dowse, 154 to 164 Oliver St.

Anvils.—"Eagle American".....per lb. 9c; dis 20 %
Augers.—Watrous Ship.....dis 10 %
L'Hommedieu Ship.....dis 30 %
Axes.—Blue Jacket.....9 00
Racer.....8 00
Red Cross, Handled.....10 50
" " Boy's.....9 00
Blue Jacket " 10 00
Axe Handles.—Wadleigh's Oak—
A (Extra) $2·50, B (No. 1) $2·00, C (No. 2) $1·50 ₩ doz
Blind Hinges.—Orr or Washburn's..₩ hun'd sets $8
Blind Fasts.—
Orr or Washburn's.....per hundred set $6 00
Bolts.—Carriage, Phila.....dis 60&20 %
Carriage, Common.....dis 75&10 %
Borax.—Best Refined.....₩ lb 11c
Borers.—Angle, Backus'.....dis 30 %
Boring Machines.—Angle.....each $4 50
Common, Snell's quality.....each 3 50
Braces.—Barber's.....dis 40&5 %
Backus'.....new list 50&10
Spofford's.....dis 50 %
Bracket
Saw Frames, with patterns complete.....₩ doz $6 00
Saws.....
Saw Frames, Centennial.....
Star Bronzed.....new list net
Star Japanned.....new list net
Store Shelf.....new list net
Brass Faucets.—L. F. & C.....dis 40 %
Brushes.—Horse, Patent Metallic.....per doz. $4·50
Butts.—Union Drilled Loose Joint.....dis 55&10 %
" " Wire Fast Joint.....dis 40&10 %
" " Acorn Loose J't.....dis 55&10 %
Brass Butts.....dis 30 %
Wrought Table Butts and Back Flaps.....revised list, dis 33 %
Wrought Narrow Butts.....reduced, dis 40 %
Cards.—
Curry Cards, No. X, per doz., $0·65.....dis 30 %
Horse " No. X, " 0·80.....dis 30 %
Wool " No. 8X, " 2·50.....dis 15 %
Cotton " No. 10, " 3·50.....dis 10 %
Cartridges.—U. S. Cartridge Co.....dis 60 %
Chisels.—"Buck Bros." Shank Goods.....dis 40 %
Socket.....dis 25 %
Compasses and Dividers.—Bemis'.....dis 40 %
P. S. & W.....dis 30 %
Cordage.—Manila (usual trade dis.).....₩ lb 14c
Corn Hooks.....per doz $2·75
Crow Bars.—Solid Steel.....₩ lb. 9c
Cow Ties.....dis 30 %
Dividers.—Cook's Nickel Plated.....dis 15 %
Door Springs.—Mossey—

Per doz.	$9·00	12·00	15·00	18·00	24·00
No.	0	1	2	3	4

Torrey's.....$2·50
Gem.....dis 10 %
Drills.—Whitney's with Chucks.....$12·50
Emery.—Alden.....₩ lb 7c
Wellington Mills.....₩ lb 10c
Flies.—American.....dis 30 %
Nicholson, new list.....dis 30 %
Wheeler, Madden & Clemson.....35 to 5; 10 %
Stubb's Tapers, genuine, 3 in., $1·50; 3½, $1·62½, $1·88; 4½, $2·13; 5, $2·50
Hammers.—Maydole—new reduced list.....dis 15 %
M., B. & D., solid cast steel, adze eye, No. 1, $10; 1½, $8·75.....dis 25 %
M., B. & D., solid cast steel, bell face, No. 1 $11; 1½, $9·75.
Hammond—new reduced list.....dis 15 %
Hangers and Rollers.—Anti-Friction.....dis 40 %
Climax.....dis 40 %
Acme Rollers.....dis 40 %
Hatchets.—Underhill Edge Tool Co.....dis 25 %
C. F. Dowse, warranted Cast Steel—
Shingling.....0, $4·75; 1, $5·25; 2, $5·75
Claw.....1, 5·75; 2, 6·25
Luthing.....1, $5·50
Axe Pattern.....1, $7·00; 2, 7·50
Broad.....0, $5·75; 1, $6·50; 2, $7·50; 3, $9·25; 4, $10·75
5, $12·75; 6 $14·75
Hinges.—Strap and T Stanley Works.....dis 60 %
Pinte, Loose and Fast Joint.....₩ lb 5c
Wrought Screw Hook.....₩ lb 5c
Knobs.—Imp. Extension Silvered Glass.....₩ doz $3·00
Lanterns.—Tubular No. 0.....$10·00
Guarded. No. 74, (with kerosene oil and candle burners).....5·50
Lead.—Sheet, 9c.; Pipe, 8½c.....dis 10 %
Locks.—Norwalk Lock Co.....dis 50 %
Mattocks.—
K. P. & Co., axe finish, long cutter.....$11 50—net
Short cutter.....11 00—net
Meat Cutters.—"Miles's" Challenge.....dis 50 %
No. 1, $22·00; 2, $20·00; 3, $40·00.
Metal.—Babbitt.....No. 1, 35c; 3, 25c; 5, 15c ₩ lb
Nails.—10d and larger.....$2 50
Nail Pullers.—Little Giant—Small.....per doz., $22·00
Little Giant—Large....." 30·00
Padlocks.—Wilcox.....dis 33½&5 %
Picks.—A. P. & Co., Solid Eyes.....5 to 6 | 6 to 7
$9 00 | $9 50
Pins.—Universal Hatand Coat all wood—
2 in.....₩ gross $2·50; 3 in., 3 50; 4 in., 4 50—dis 15 %
Planes.—Auburn Tool Co.....dis 40 %
N. Y. Tool Co.....dis 50 %
Plated Ware.—Rogers Bros.....dis 40 %
Pocket Knives.—Conn. Cutlery Co.....new net list
American Shear Co.....new net list
Plumb & Levels.—Stanley.....dis 60&10 %
Pulleys.—Axle.
Frame pol. wh't pt. face, No. 15, 1 ⅛ in., 20c.; 16, 2 in., 26c.
Pol. wh't br'zed face No. 115, 1⅛ in., 30c.; 116, 2 in., 26c.
Pulley Blocks.—"Best Boston Make".....net
Rail Barn Door.—For Novelty and Anti-Friction Hangers.....per foot 7c.. dis 40 %
Refrigerators—Heinz Patent.....dis 20 %
Rivets.—Black.....dis 40 %
Carriage, oval head, Nos. 2, 4, 5, 6, 7, 8.....dis 30 %
13 13 14 14 15 16c ₩ lb
Sad Irons.—Bliss & Drake.....₩ lb 8½c
Sand Paper.....dis 15 & 5 %
M. B. & D.....0 to 2, $4·75; 2 to 3, $4·75
Saws.—*Hand and Panel*—
X Cut, Wheeler, Madden & Clemson.....per ft., 35c
" Champion.....45c
" Lightning.....45c
" Great American.....50c
Wood Saws, Welsh & Griffith.....₩ doz $14·00
Wheeler, Madden & Clemson's, same list as "Disston's".....dis. 20 %
Disston's.....dis. 20 %
Saw Horses.—Extra.....₩ doz $2·25
Folding....." 3·50
Screws.—Am. Screw Co., new list Sept. 1st dis 40&10 %
Aiken's.....dis 60&10 %
Scythe Stones.—
"Willoughby Lake," first quality.....₩ gross $4·50
" second quality.....3·00
Shovels.—O. Ames.....dis 30 %
M. B. & D.....dis 30 %
Spading Forks.—W. C. & Co.....dis 40 %
Tools.—Aiken's Pattern.....₩ doz $5·00
Aiken's Genuine, $12.....dis 40 %
" " Saw Sets, $18.....dis 40 %
Traps.—Oneida.....dis 25 %
Blake's.....dis 40 %
Vises.—K. F. & Co.'s Solid Box, Blacksmith.....₩ lb 12c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards" Parallel.....dis 25 %
Wardrobe Hooks.—Wire to drive.....₩ gross $1 00
Weights.—Window Weights.....₩ lb 12
Wedges—Axe.....₩ doz 33
Wire.—
Eureka in spools, No. 29 to 40 assorted...₩ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, 4½c
Dead or Black.....₩ ft 4½c
Wrenches.—Genuine Wrenches, G. A. Coes..d's 40&10%
Wringers.—Universal XX No. 2.....₩ doz $66 00
Novelty, No. 10....." 63 00
" No. 2....." 66 00
" No. 22....." 70 00
Excelsior A, with bench....." 84 00
" E, set tubs....." 72 00
Eureka....." 57 00
Welcome....." 60 00
Witnington, Cooley & Co.—Hoes, Rakes, Forks &c. dis 40 %. Special rate for Export.

ST. LOUIS.

Corrected weekly by Semple & Birge Mfg. Co.

Animal Pokes.....$7·50 ₩ doz. net
Apple Parers.—Conqueror.....₩ doz $7 75
Hudson's Rotary.....7 75
Axes.—Wm. Mann's, Red Warrior.....₩ doz 9 75
"C. Marshall".....9 25
Handled.....$5 extra
Double Bitted.....19 50
Hunt's.....12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles.....dis 30 %
Common Axles (Pat. Lubricating), 1¼ inch and upward.....₩ lb. 6c
do. less than 1¼ inch....." 6½c
Babbitt Metal.—

Nos.	4	3	2	1	A 1	Genuine.
	9½	11	16½	20	31	34c ₩ lb.

Bellows.—Best St. Louis make, new list....dis. 12½ %
Bells.—Troy, Church, School and Farm Bells..₩ lb 50c
"Improved Amalgam Bronzed" 15 in., $7·00; 17 in., $2·50; 19 in., $4; 21 in., $5; 24 in., $14; 27 in. $19·50
Belting.—"Boston Belting Co.'s" Rubber.....dis 50&10 %
Bradford & Sharp's" Oak-Tanned Leather.....dis 35 %
Boilers.—Farmer's Profit Feed Boilers.....dis 20 %
" Caldrons.....dis 25 %
" Sugar Kettles.....dis 30 %
Belting Cloth.—New gold list.....net
Bolts.—Arms, Bell & Co.'s Carriage & Tire..dis 70 & 10%
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 25, 12½&10 %
Broad Fast Joint.....dis 35, 12½&10 %
" Loose " .....dis 45, 12½&10 %
Reversible.....dis 40, 12½&10 %
" Japanned and Silver Tipped..dis 50, 12½&10 %
Loose Joint " Acorn " " " ..dis 45, 12½&10 %
Churns.—Julien, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50.....dis 25 %
Cider Mills.—
Buckeye Senior $27·00: Buckeye Junior, 18·00.....net
Corn Knives.—Dunn E'ge T'ol Co.'s Chp...₩ doz 4 50
Seymour Mfg. Co.'s solid Steel Back.....4 50
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Cotton Gins.—Carver, with 10 in. Saws, $9·25 a Saw..net
9 in. Saws, $4·00 a Saw.....net
Crow Bars.—Steel Pointed.....₩ lb 6c
Drag Saw Machines.
Culver's Iron Drag Saw.....dis 15 %
Excelsior Drag Saw with Log Trucks.....dis 12½%
Fanning Mills.—Nash & Cutt's.....dis 25 %
Feed Cutters.—Burdick National.....new list, net
Sanford No. 1, $10·00; No. 2, $8·00.....net
Bowman's Lever Cutter, $6·50.....net
Files.—Black Diamond, Mill.....$5·00 & currency
" Bastard.....5·00 & currency
" Taper.....5·00 & currency
Forges and Blowers.
Keystone Portable Forge Co.'s.....dis 10
Forks and Hoes.
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 35 %
" " Handled Hoes.....dis 35 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis 20 %
" Planet Drill, Nos. 2 and 3.....dis 20 %
" Combined Drill and Wheel Hoe.....dis 20 %
Grinding Mills.—Challenge Feed Mills.....dis 15 %
Sedgebeer's Nonpareil Mills.....dis 15 %
Bradford's French Burr Mills.....dis 5 %
Hammers.—Masons' Hammers.....₩ lb 18c
Smiths' Hand....." 19c
Handles.—No. 1 Fork, Hoe and Rake.....dis 25 %
No. 2 Fork, Hoe and Rake.....dis 30 %
Ax, Pick, Sledge and Small Handles.....net 10%
Hay and Cotton Presses.
Dederick's Railroad.....dis 10
" Perpetual.....dis 10
Hay Knives.
Dunn Edge Tool Co.'s.....₩ doz $12 00 net
Lightning (Weymouth's Patent).....₩ doz $20 00
Horse Nails.—National Patent Pointed.....40c rate
National Patent Pointed, extra finished.....32c "
Horse Powers.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Hose.—
Boston Belting Co.'s Rubber Medium Sizes..dis30&10 %
" " " S. Siz. Hydrant..dis 40 %
Mattocks and Grub Hoes.
Klein, Logan & Co.'s Mattocks.....₩ doz $11 25 @ 11 60
" Grub Hoes, oval eye " 8 30 @ 9 25
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $33·00 net
Nails.—Wheeling Riverside Brand.....$2 50 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25&5 %
" " No. 3 Plate.....dis 40 %
" " Round and Square.....dis 10&10 %
Picks.—Railroad and Clay.....₩ doz $8 00 @ 9 75 net
Coal....." 6 50 @ 7 20 net
Pob....." 9 45 @ 13 15 net
Stone....." 11 00 @ 11 60 net
Tamping....." 11 75 @ 12 25 net
Miners' Drifting....." 7 80 @ 10 60 net
Plows.—Avery's Cast and Steel.....dis 30 %
Avery Sulky Plow.....dis 30&5 %
Collins Cast Cast steel.....new list net
Pekin Steel.....dis 25 %
Plow Sulky.—Buckeye.....$27 00 net
Post Hole Augers.—Clark's Patents—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 25 %
Pulleys.—5 inch.....per doz $3·70 net
4 inch.....per doz 2·50 net
Pumps.—St. Louis Farm, Patent Metal Lined..dis 30 %
Rakes.—Advance Paddock Sulky.....each $34 00 net
St. Louis Revolving 14 tooth.....4 45 net
" " 16 " .....465 net
" Hand Hay Rake.....per doz $2·50
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....25 40 %
" " Sections.....dis 40 %
Road Scrapers.—Steel.....each $3·50 net
Cast Iron.....dis 10&2 %
Saws.—Curtis & Co.....dis 1 %
Scythes.—Dunn Edge Tool Co.'s.....dis 30 %
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7·00
Extra Indian Pond.....7 50 } dis 25
Premium.....10 50
Diamond Grit.....13 00
Shovels and Spades.—Groom Shovel Co.....dis 40 %
Grain Scoops—Patent Cor'g Straps Groom Shovel Co.....dis 40 %, and 50c per doz extra
do. M. Rowland & Co., dis 30 % and 50c " "
do. O. Ames & Son, dis 27½ % and 50c " "
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₩ lb 14c net
Solid Cast Steel....." 10c net
Snaths and Cradles.—Seymour Mfg. Co.'s.....dis 30 %
Sorghum Machinery.—Bell Cane Mills.....dis 30 %
Scantlin's Seamless Pans and Evaporators.....dis 30 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....₩ lb 14½
Blue Seat Springs.....₩ pair, $1 00
Thimble Skeins.—Whitewater's.....dis 40&10 %
Vises.—Wilson Mfg. Co.'s.....₩ lb. 14½c
Wheelbarrows.—Champion Iron Wheel.₩ doz $19·50
Champion Wood Wheel.....₩ doz 27·50
" Garden.....₩ doz. 39·00
Wagons.—Whitewater Farm Wagons—
Thimble Skein—
2⅜ in. $66; 3 in. $67·50; 3½ in. $70; 3½ in. $71
Wire Bale Ties.—Buckeye Double Twist.....net list
Dederick Adjustable.....new list, dis 25 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 10x14, Best Char.	$ 7 75	DX, 12½x17, B. Char.	$10·25
IX, 10x14, "	10·25	DXX, 12½x17 "	12 75
IC, 12x12, "	7·75	DXXX, 12½x17 "	15·25
IX, 12x12, "	10·25	IC, 20x28, "	15·00
IC, 14x20, "	7·75	IX, 20x28, "	22·50
IX, 14x20, "	10·25	IXX, 20x28, "	28·00
IXX, 14x20, "	12 75	IC, 14x20, Best Roof	7·25
IXXX, 14x20, B. Char.	15·25	IX, 14x20, "	9·75
IXXXX, 14x20, "	17·75	IC, 20x28, "	15·00
IC, 12x24, "	8·00	IX, 20x28, "	19·00
IC, 14x14 "	15·25	IC, 10x14, Best Coke	6 75
IX, 14x14, "	18·25	IC 14x20, "	6·75
IXX, 14x14, "	21 25	IC, 10x20, "	11·00
DC, 12½x17, "	7·75		

Sheet Iron.	Com'n.	S L U D. Ref'd Smo'th.	Jum'a Sm'th
No. 16 to 20	3·2c	4·2c	7·9c
No. 22 to 24	3·0c	4·2c	7·9c
No. 26	3·0c	4.4c	8·1c
No. 27	3·0c	4·6c	8·3c

Genuine Russia Iron.
Perfect—No. 9, 10, 11, 12.....per lb. 13½c
No. 1 Stained—No. 9, 10, 11, 12.....per lb. 12½c
Tare 24 lbs. to Bdle. For less than Bdle. add 1c. ₩ lb.
Patent Planished Iron.
No. 24 to 27, A quality.....per lb. 11c
" B " 9½c
For less than Bdle. add 1c. per lb.
Galvanized Sheet Iron.
Juniata, or 1st quality.....dis 33 %
Block Tin.

Banca, Large Pigs	32c	do. Small	31c
Straits, Large Pigs	30c	Bar	32c
Eng. Ref'd, Large Pig	26c		

Solder.

Extra in Bars	14c	No. 2, in Bars	12c
No. 1, in "	13c	Spelter Solder	26c
Pig Lead—Pigs	7c	In Bars	8c
Antimony			15c
Bismuth			$2 15
Nickel			3 00
Crucibles.—Dixon's			₩ No. 5c
Babbit Metal.			
No. 1	₩ lb. 18c	No. 3	₩ lb 13c
" 2	" 16c	" 4	" 8½c

Copper.
Brazier's, 30x60, 14 to 100 lbs. Sheets.....30c
" " 10, 11 & 12 lbs., " 32c
" " 8 and 9 lbs. " 34c
" " 6 and 7 lbs. " 36c
Tinned, 14x48, 14 and 16 oz.....30c
Planished, 14x48, 14 and 16 oz.....36c
" Boiler Sizes. 14 and 16 oz.....34 c
Gutter Copper, 20 and 24x72, 10, 11 and 12 lb. Sheets 32c
" 14 lb. Sheets.....30c
Reservoir Copper, 16x60 and 18x60.....33c
Bar Copper, Square and Round, ⅜ to 1½ inch.....31c
" " ⅝ inch.....34c
Copper Bottoms.....33c
Soldering Coppers.....32c
Brass.
Roll, No. 10 to 28, 12 in. in width.....30c
" 20, 17 in. in width.....31c
" 32, 16 " 36c
" 34, 16 " 37c
" 36, 16 " 38c
Platers, No. 46, 6.....38c

Brass and Copper Wire.

	Brass.	Copper.		Brass.	Copper.
No. 0 to 20	34c	45c	No. 24	39c	50c
" 21	35c	46c	" 25	42c	53c
" 22	36c	47c	" 26	44c	56c
" 23	37c	48c	" 27	46c	61c

Brass Spring Wire, 2c. ₩ lb advance.
Brass Tubing.
Plain to No. 20.....45c | 5-16 inch.....50c
⅜ inch.....50c | ½ " 53c
Copper Rivets and Burs......dis 10 %
Brass Kettles......₩ lb 43c
Sheet Zinc.—600 lbs. cask.....8c
250 lbs. cask.....8½c
Sheet.....8½c
Wire.—Iron, Bright Market.....dis 50 %
Iron, Coppered Market.....dis 45 %
Fence, Nos. 5, 8 and 9.....₩ lb 4½c
Trellis, Nos. 10 and 11.....5c
" No. 12.....5·2c
Hay Baling, Charcoal, No. 10 and 11.....5½c
" " No. 12.....5½c
Broom, Tinned, Nos. 18 to 22.....12c
Fence Staples.....per keg $3
Per lb.....4½c
Iron Rivets.—Black, papered.....dis 5
Tinned, papered.....dis 5
In bulk.....new 3-16 ¼ 5-16 ⅜ tinned.
11¼c 10½c 10 c 9½c per lb.
Sad Irons.....₩ lb 8½c
Enameled Kettles.—Standard Mfg. Co.....dis %
Enameled Sauce Pans.
Standard Mfg. Co.....dis %
Enameled Boilers.—Standard Mfg. Co.....dis %
Dripping Pans.—Smooth Iron.....₩ lb
Geneva Fluters.....per doz $15 00
Mouroe Fluters....." 14 00
Stove Polish.—Dixon's.....per gross 6 00
Gem.....4 50
Japanese.....3 50
Dixon's, in bulk.....₩ lb 10c
Coffee Mills.—Parker's.....dis 30 %
Granite Iron Ware.....dis 25 %
Spoons.—New list.....dis 10 %
Retinned Iron Ware.....35 % off
Plain Stamped Ware.....35 % off
Japanned Ware.—St. Louis list.....dis 40&5 %
Dry Pans.....dis40 %
Bars.....dis 50%

THE JUDSON GOVERNOR.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List,

FEBRUARY 1, 1877.

☞ For dimensions of Governor, see Illustrated Price List.

THE JUDSON PATENT

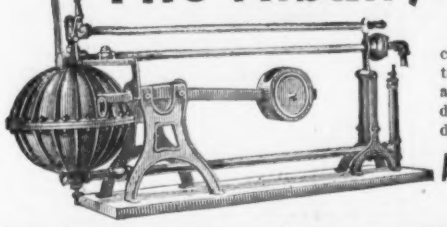
Improved Steam Governor.

Size, Inch.	Plain.	Bright Finished.	Extra for Spec'l'r	Stop Valve.
⅜	$16·00	$18·00	$1·90	..
½	18·00	20·00	1·90	..
1	20·00	22·00	2·00	$5·00
1¼	23·00	26·00	2·25	6·00
1½	26·00	30·00	2·50	8·00
2	31·00	35·00	2·75	10·80
2¼	36·00	41·00	3·25	12·00
2½	40·00	45·00	3·50	14·00
2¾	45·00	51·00	3·75	16·00
3	50·00	57·00	4·25	19·00
3½	59·00	67·00	4·50	23·00
4	69·00	78·00	5·00	28·00
4½	80·00	90·00	5·50	34·00
5	90·00	101·00	6·00	40·00
5½	105·00	117·00	6·50	46·00
6	120·00	133·00	7·00	54·00
7	142·00	156·00	8·00	65·00
8	175·00	192·00	9·00	79·00
9	198·00	218·00	10·00	..
10	210·00	240·00	12·00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

The Albany Steam Trap.



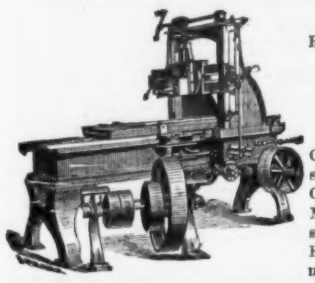
This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

The Pratt & Whitney Co.,

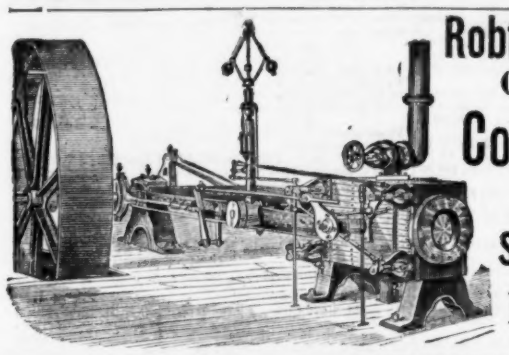
Hartford, Conn.,

Have constantly on hand and making



Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



Robt. Wetherill & Co

CHESTER, PA.

Corliss Engine

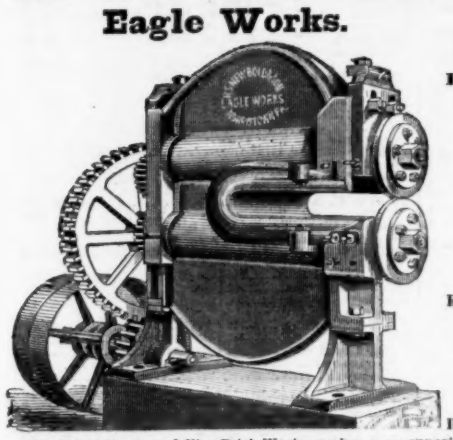
BUILDERS,

Shafting & Gearing,

Boiler Makers.

R. S. NEWBOLD & SON,

Eagle Works. Norristown, Pa.



IMPROVED ROTARY SHEARS,

Rolling Mill, Blast Furnace, Flour Mill, Mining and Water Works Machinery. Air Compressors, Ore Washers and Brick Machines.

REFERENCES:

Rotary Shears for Plates and Circles.
A. Wood & Co., Conshohocken, Pa.
Ernst Stridsberg, Sweden.
Lewis Dalzell & Co., Pittsburgh, Pa.
H. A. Beale & Co., Parkesburg, Pa.

Rolling Mill & Blast Furnace Plants & Engines.
Merion Furnaces, Conshohocken, Pa.
Aurora Furnace, Wrightsville, Pa.
Clovespring Iron Works, New York.
Norristown Water Co.
Oliver & Co., Easton Sheet Mill.
Pottstown Iron Co.'s Plate Mill.
Parkesburg Flue Mill.
Morris, Tasker & Co., Engines.

Durand & Marais' French Pat. Brick.

For Brick Yards and Fire Brick Works, makes 10,000 superior bricks per day with two horse-power. In use at Brookville Brick Yards, Lynchburg, Va.; F. W. Kickbusch, Wausau, Wis.; Cheltenham Fire Brick Works, St. Louis, Mo. Can hack bricks 12 high at once. The best, simplest and cheapest machine made.

THORNE, DeHAVEN & CO., Drilling Machines,

21st Street, above Market, Philadelphia.

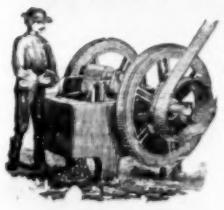
PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

H. H. HARVEY'S HAMMER AND TOOL WORKS, Augusta, Me.

SPECIALTIES.—Stone Cutters' Hammers and Tools, Quarrymen's Drills, Wedges and Half Rounds, &c., &c., &c., Miners' Hammers and Tools, Blacksmiths' Hammers and Tools, Patent Hammers for picking burr stone. Also the common Mill Picks and Wood wedges Steel or Iron, R. R. Solid eye Picks, with one lb. of best Cast Steel inserted in each pick. The above goods are warranted inferior to none, both in quality and style of finish. All hammers have true eyes and polished faces, and are made from solid cast steel. No charge is made for boxing or carting at Augusta; shipping facilities are excellent. Hammers made to any pattern or drawing. Capacity of works, one ton of hammers per day. A full line of the above goods constantly in stock. Catalogue on application.

BLAKE'S PATENT
STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



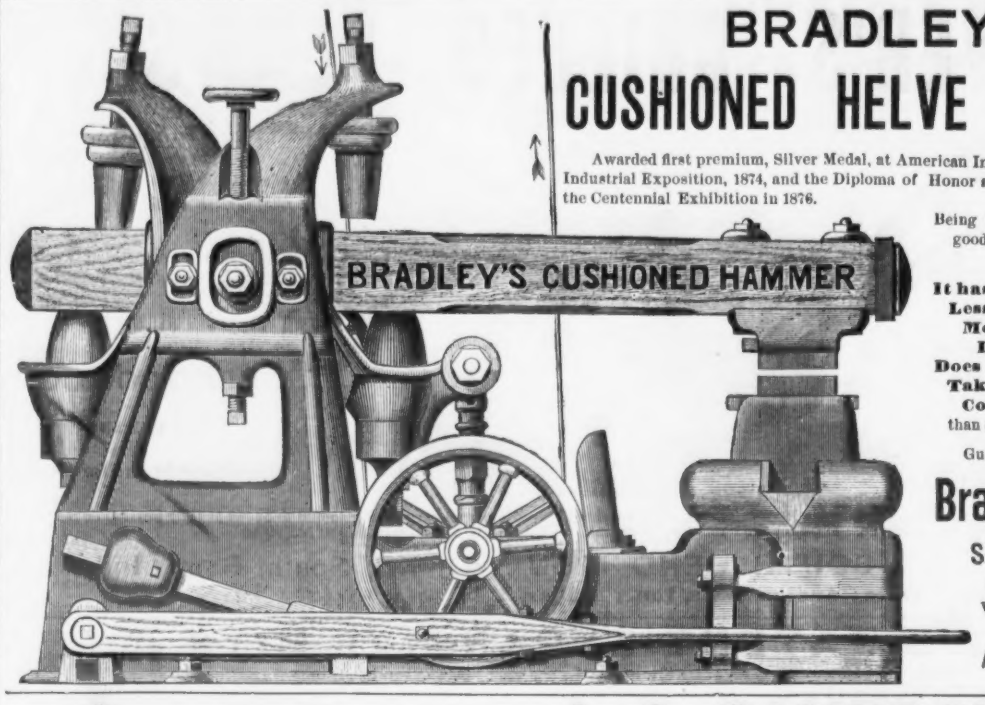
For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

For Illustrated Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven, Conn.



BRADLEY'S
CUSHIONED HELVE HAMMER.

Awarded first premium, Silver Medal, at American Institute Fair, 1873, Cincinnati Industrial Exposition, 1874, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876.

Being the highest award given any goods of their class in America or Europe.

It has More Good Points,
Less Complication,
More Adaptability,
Larger Capacity,
Does More & Better Work,
Takes Less Power,
Costs Less for Repairs,
than any Hammer in the World.

Guaranteed as Represented.

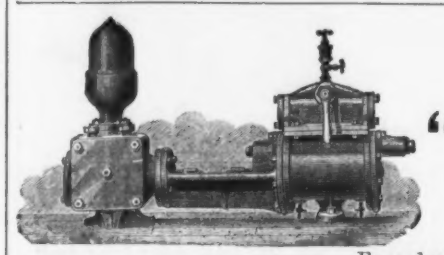
Bradley Mfg. Co

SYRACUSE, N. Y.

(Established 1832.)

Western Office, *22 S. Canal St., Chicago, Ill.*

A. B. BARNES, Manager.



A. S. CAMERON'S
PATENT
"SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad.

For reduced price lists address **A. S. CAMERON, East 23d Street, New York.**

HAMMER & CO.,

Branford, Conn.,

Manufacturers of the following *Patented* Articles of

MALLEABLE IRON:

Hammer's Adjustable Clamps.
Hammer's Malleable Iron Oilers.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.

For Sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of superior Quality and Hardware Specialties in Malleable Iron made to order.

LANE & BODLEY CO.,
HYDRAULIC ELEVATORS

For Stores, Warehouses, Residences and Hotels.

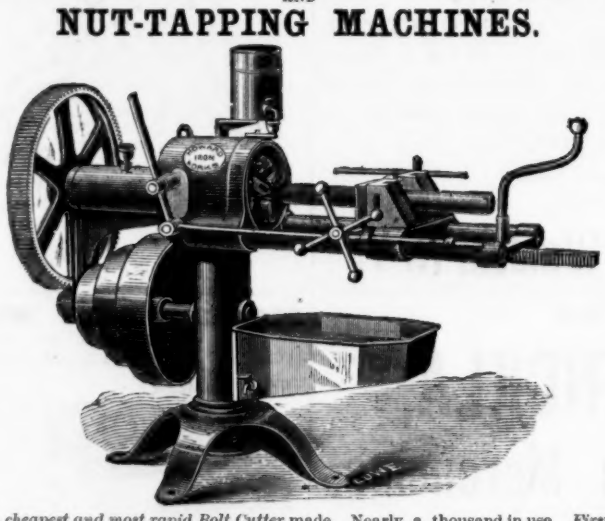
These elevators have advantages over special steam service, in first cost of construction, running expense, convenience, cleanliness and saving of insurance.

We have a large number in operation and they have been fully tested. Satisfactory results guaranteed.

LANE & BODLEY CO.,

John and Water Streets, Cincinnati, O.

Schlenker's Bolt Cutters
AND
NUT-TAPPING MACHINES.



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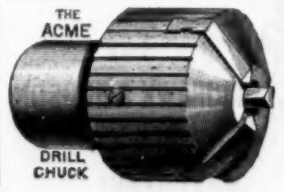

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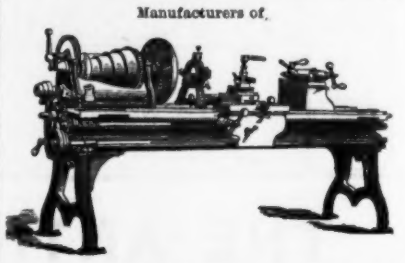

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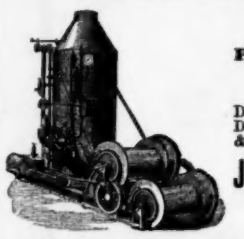

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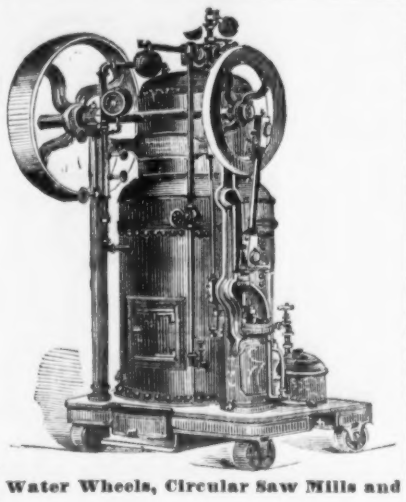

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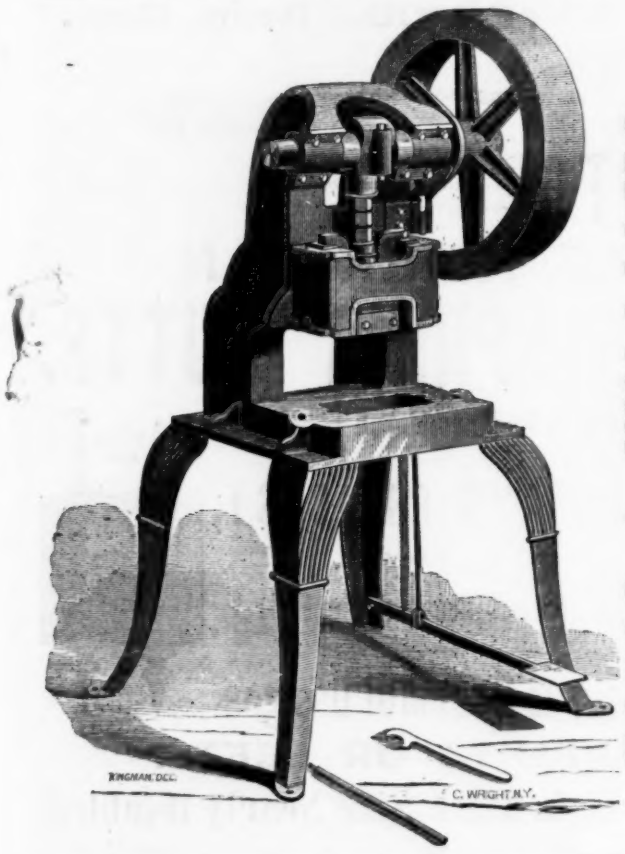

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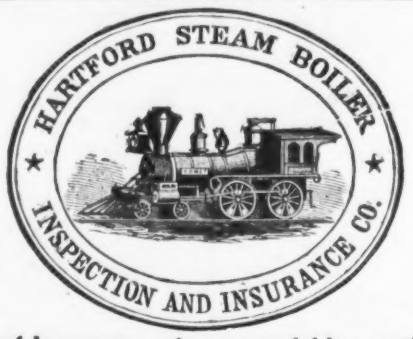

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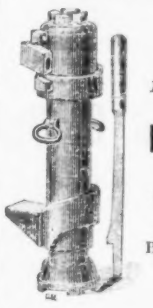

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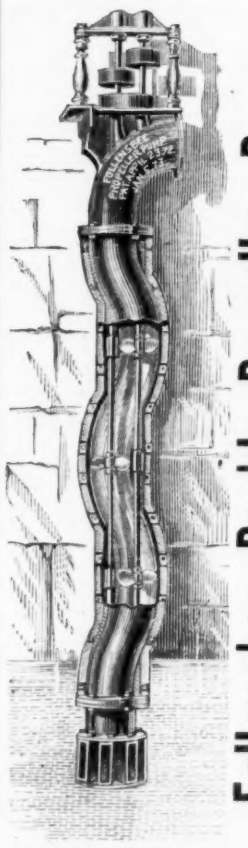

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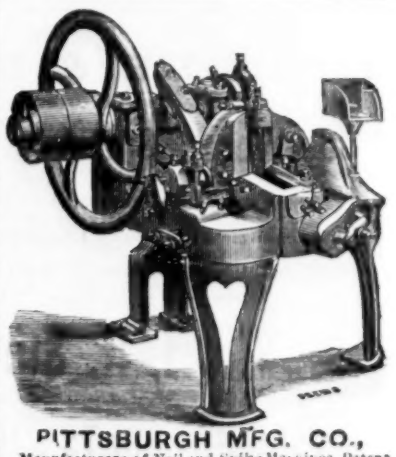

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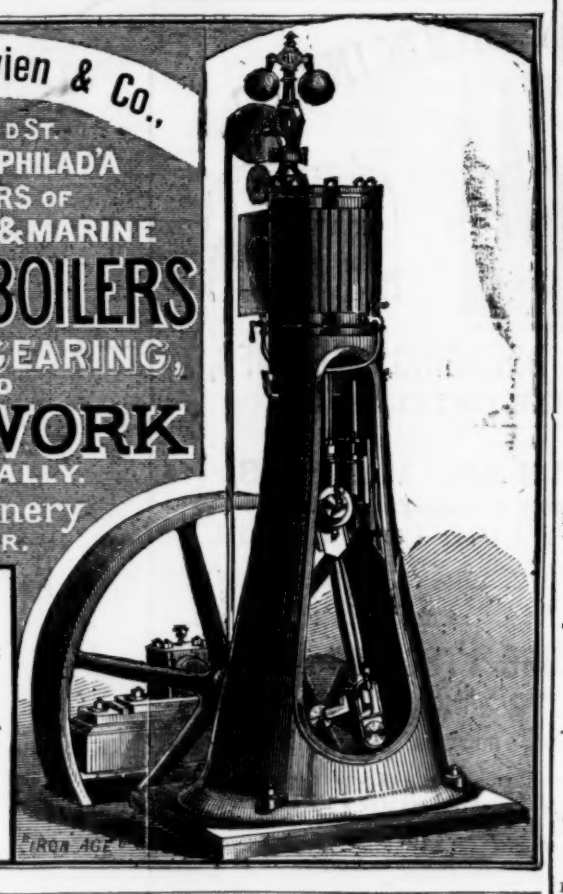

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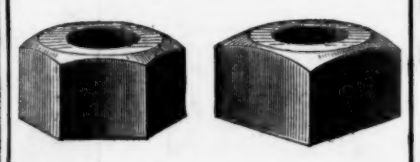

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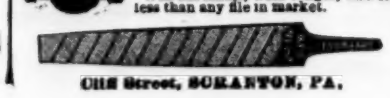

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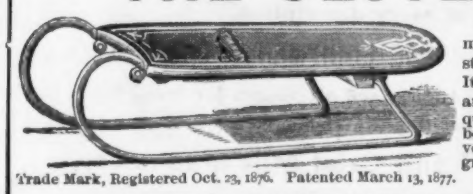

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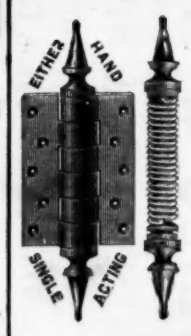

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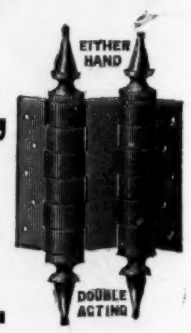

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